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Application No.	S2002/0580
Date of Filing	12th July 2002
Applicant	Thurdis Developments Limited, An Irish Company of 9 Adelaide Court, Adelaide Road, Dublin 2, Ireland.

Dated this 30 day of July 2003.

PRIORITY DOCUMENT
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FORM NO. 1

Request for the Grant of a P[illegible]nt APPLICATION NO. S020580

PATENTS ACT, 1992

The Applicant(s) named herein hereby request(s)

☐ the grant of a patent under Part II of the Act

☒ the grant of a short-term patent under Part III of the Act

on the basis of the information furnished hereunder

1. Applicant(s)

Name: THURDIS DEVELOPMENTS LIMITED

Address: 9 Adelaide Court
Adelaide Road
Dublin 2
Ireland

Description/Nationality: An Irish company

2. Title of Invention: INTERACTIVE MULTIMEDIA APPARATUS

3. Declaration of Priority on basis of previously filed application(s) for same invention (Sections 25 & 26)

Previous Filing Date	Country in or for which Filed	Filing No.
.....	.....	.....
.....	.....	.....
.....	.....	.....

4. Identification of Inventor(s)

Name(s) of person(s) believed by Applicant(s) to be the Inventor(s)

Name: JAMES ANTHONY BARRY

Address: 3 Palmerston Park
Rathmines
Dublin 6
Ireland

5. **Statement of right to be granted a patent (Section 17(2)(b))**

.....

.....

6. **Items accompanying this Request - tick as appropriate**

(i) ☒ prescribed filing fee (€60.00)
(ii) ☐ specification containing a description and claims
☒ specification containing a description only
☒ drawings referred to in description or claims
(iii) ☐ an abstract
(iv) ☐ copy of previous application(s) whose priority is claimed
(v) ☐ translation of previous application whose priority is claimed
(vi) ☐ Authorisation of Agent (this may be given at 8 if this Request is signed by the Applicant(s)

7. **Divisional Application(s)**

The following information is applicable to the present application which is made under Section 24:-

Earlier Application No. ..... Filing Date .....

8. **Agent**

The following is authorised to act as agent in all proceedings in connection with the obtaining of a patent to which this request relates and in relation to any patent granted:-

MACLACHLAN & DONALDSON, 47 Merrion Square, Dublin 2

9. **Address for Service (if different to that at 8)**

MACLACHLAN & DONALDSON, at their address as recorded for the time being in the Register of Patent Agents (Rule 92)

Signed Name(s) THURDIS DEVELOPMENTS LIMITED

By .....
MACLACHLAN & DONALDSON, Applicants' Agents

Date: **July 12th 2002**

INTERACTIVE MULTIMEDIA APPARATUS

The present invention relates to an interactive multimedia apparatus.

Schoolchildren, teenagers and even adults are often seen with a brush, hockey stick or tennis racket in their hand strumming along to a guitar track in the background. This is known as playing the "Air Guitar". Simulating the playing and movements of the Guitarist with the "Air Guitar" is a very important part of the musical experience, especially to songs with strong instrumental tracks. The users can fantasise and imagine themselves as the lead or bass guitarist playing in the company of their idols. Air Guitarists, however, have only a limited enjoyment experience as their action and movements do not influence the sound output in any way. There is clearly a need for a method of providing a user with a greatly enhanced musical and emotional experience using an "Air Guitar" or other "Air Instrument" when played in this way.

US-A-5,990,405 (Gibson Guitar Corp) discloses a system for generating and controlling a simulated musical experience in which a musician can simulate participation in a concert by playing a musical instrument and wearing a head-mounted 3D display that includes stereo speakers. Audio and video portions of a musical concert are pre-recorded, along with a separate sound track corresponding to the musical instrument played by the musician. Playback of the instrument sound track is controlled by signals generated in the musical instrument and transmitted to a system interface connected to the audio-video play back device, an audio mixer and the lead mounted display. The instrument sound track can be suppressed so that that actual sound generated by the musician playing the musical instrument can be heard with the pre-recorded audio and video portions.

The Gibson Guitar system is a specific hardware apparatus designed for use by an experienced musician and pre-supposes that the user will have access to a mixing console or decoder capable of separating a backing track audio from the composite audio. The input device is a standard electric guitar which produces analog audio signal outputs. Therefore this system is not suitable for use by an "Air Guitarist" and cannot be directed to a mass market of persons who appreciate music but have no musical training.

Accordingly, there is provided an interactive multimedia apparatus comprising:

a music simulation instrument having activation means operable by a user to generate electric signals in response to the user's activation and selection;

a control unit;

storage means for at least one simulation backing track in any desired multi-media file format;

and audio/audio-visual means for playing a main track;

the control unit having:

software for receiving and analyzing the electrical signals from the music simulation instrument; and

means for synchronizing the simulated backing track with the main track playing on the audio/audio-visual means during playback and for maintaining synchronization during playback;

whereby in operation, the software of the control unit opens the backing track multi-media file and streams the file in mute mode in synchronisation with the main track, and whereby in response to the electrical signals from the music simulation instrument, the control unit generates an output from the multi-media file to an audio/audio-visual means

This mode of operation of the apparatus is referred to as synchronised mode. The file must be available at the control unit and be retrievable by software stored in the control unit. Furthermore, it is essential that the backing track is being played to the speakers in synchronisation with the original track playing on the audio-visual unit. Therefore, the control unit must be connected directly to the audio-visual output to be assured of synchronisation.

Ideally, the control unit has input/output connections for the Internet.

Preferably, the multi-media is file downloadable in MP3 format, wav format or any other file format for storing audio information digitally.

Preferably, each file contains any individual instrumental track from a selection of available tracks whereby an operator may download a piece of music with any track removed and additionally download that track separately to play along with the piece of music. In a typical recording studio each musical element is recorded separately onto a digital track, e.g. track one - main vocals, track two - backing vocals, track three - rhythm guitar, track four - lead guitar, track five - bass guitar, track six - keyboards and so on. The tracks are merged as one mix in the final output of the song as it appears on a music CD. An operator may download a piece of music with any track removed and additionally download that track separately from the Internet to play along with the piece of music.

Ideally, the software in the control unit starts the main track and streams the backing track in mute synchronization with the main track and when the software receives an electrical signal from the music simulation instrument, the software outputs an audible signal from the multimedia file.

Preferably, the software in the control unit detects the length, and amplitude and/or frequency of the electrical signals received from the music simulation instrument and in which the software adjusts the output from the multi-media file to the audio/visual means as a direct response to the characteristics of the signal from the music simulation instrument.

Conveniently, the formatted file is generated by analysing the contents of the instrument-backing track of an album and recreating the notes and chords in any multi-media file format to

(a) generate a file which will provide valid and meaningful output even during periods when the album backing track is silent.

(b) always generate an output even if the user operates the activation means at the wrong time or incorrectly; and in which the outputs provided in the event of (b) are sympathetic to the main track's structure and melody.

The means for analysing a master backing instrument track includes software and algorithms.

In a further aspect of the invention, there is provided an interactive multimedia apparatus comprising:

a music simulation instrument having activation means operable by a user to generate electric signals in response to the user's activation and selection;

a control unit;

storage means for one or more multi-media files in any format;

and an audio/audio-visual means for playing a background track;

the control unit having:

software for receiving and analyzing electrical signals from the music simulation instrument; and

means for opening and playing extracts from the multi-media files in response to the electrical signals, whereby in operation, the software of the control unit opens the selected multi-media files and generates an output from the multi-media files to the audio/audio-visual means together with the background track

This mode of operation of the apparatus is referred to as standard mode and does not involve any software synchronisation between the sound generated by the software in response to an operator activating the instrument and the audible output from the main track through the audio-visual equipment.

Ideally, the multi-media files are played simultaneously with a CD, DVD or other primary source of music playing on the audio-visual equipment. Sound is generated in direct response to an operator's action, which enhances the overall musical experience for the operator.

Preferably, the means for opening and/or playing extracts from the multi-media file is operable by user activated controls members which send a signal to the software of the control unit in response to being pressed.

Ideally, each control member has an associated file stored on the control unit, whereby in use, the user activates a control member and the software opens the associated file and plays it directly or in response to the activation means of the music simulation instrument being operated.

Preferably, the apparatus is provided with a series of special effect controls which when operated by a user send signals to the software to produce a variety of special effects on the audio/audio-visual output. There are a variety of different ways of manipulating sounds using effects. Frequencies of samples can be raised or lowered, resonance can be distorted (overdrive) or echo can be added through delay and feedback.

Conveniently, the apparatus includes means for storing the newly generated output to any desired storage device such as a hard disk, a compact disc, a DVD device or the like.

Preferably the apparatus includes a series of visual display screens which are operable to enable a user to launch a game experience, select different operating modes, choose a source music device, select a backing track and/or assign digital sound effects files to the special effects controls on the music simulation instrument.

The music simulation instrument may be connected to a joystick port of a personal computer, games console or via a USB, RS232 port or the like.

Optionally, the multimedia file may contain a riff, a sample, a loop or a track. A riff is a series of notes that form a section of a musical track. A song might contain a guitar riff of eight notes followed by a series of guitar riffs to form a lead solo. Some software music studios have riff generators that allow the creation of unique riffs instead of using pre-recorded riffs. There are also different digital formats for riffs such as .wav and .mp3. A sample is a pre-recorded piece of music that is usually not very long such as a five-second bass riff, or a two-second drum loop. Many CD's are available that offer thousands of royalty-free sound samples. A loop is a riff that when repeated over and over again forms a seamless track of music. A bass loop may contain a six-note riff that can be repeated a number of times to form some of the bass-line of a song.

Preferably, the music simulation instrument comprises a guitar or a guitar type device in which the activation means operable by the user comprise a series of strings and a transducer to convert the strumming of the strings into electrical signals.

Conveniently, the guitar or guitar type device includes a control panel, selection controls, a volume control and the said special effect controls.

Ideally, the control panel allows a user to navigate through the software interface which is provided by a mask on the screen of the visual equipment. This allows the user the opportunity to remotely select a wide range of multi-media files at any time.

Ideally, the transducer is provided by a magnetic pick-up.

Preferably, the apparatus includes an interface for sending the electrical signals generated by the transducer to the control unit, the interface being provided between the transducer and the input port of the control unit, the interface unit enabling the user to generate a plurality of different control signals to the control unit.

Ideally, the interface includes an amplifier and level detectors to detect the force with which the user strums or strikes the strings. The software includes means to decipher the electrical signals from the instrument and generate a sound wave at the correct amplitude.

Ideally, the interface unit is provided with a potentiometer which varies the duration of the sound of the multimedia file.

Ideally, customised driver software is provided with the instrument avoiding the necessity for calibration.

Preferably, the music simulation instrument is connected to a Universal Serial Bus (USB) of the control unit.

In a further embodiment, the music simulation instrument is connectable to a microphone input/output connections of the control unit.

Preferably, the control unit comprises a personal computer, a cable or satellite television decoder or a games console and the audio/audio-visual means comprises a mono or stereo high fidelity audio apparatus, a television, a monitor or a like audio/audio-visual output means.

Preferably, the visual equipment of the control unit has options in the form of user interface screens allowing a user to remotely operate the entire multimedia apparatus with the control panel of the music simulation instrument.

Ideally, the options available to a user range from connecting to a website to selecting a variety of files available for downloading on the website.

Preferably, the music simulation instrument is used to control games.

In a still further aspect of the invention, an operator can use the music simulation instrument and the software interface as a sixteen or twenty-four track recording studio. The studio allows an operator to save their compositions in a format for future synchronized play and also in a format for writing their own CD's. Other export formats are MP3 and wav.

Ideally, an operator can drop samples of riffs and loops onto individual tracks to compose their own music/songs. Bass loops, drum loops, rhythm guitar and lead guitar riffs and loops in different musical instruments are provided. Samples are available on CDs and can be downloaded from the net.

Preferably, the user will be able to set beats per minute BPM, create his own riffs, loops, and effects and change the pitch of selected sections. BPM stands for beats per minute and is also known as the tempo of a song, or in other words the speed at which a song is played. Different songs will have different BPM e.g. a lot of Techno/Dance/Hip-Hop will

have 130-180 BPM. It is important when creating a song made up of sample riffs and loops that all the samples have the same BPM. Some software programs allow the transposition of samples from one tempo to another without changing the pitch of the sample.

Ideally, an operator uses the interface to create CD jewel box graphics that can be printed on any printer for distribution.

Ideally, a number of music simulation instruments can be connected to the control unit at one time allowing multi-user operation of the apparatus. One guitarist could control the lead guitar, another the base, and another the rhythm guitar and roles could be switched while playing. In Jam mode, players could improvise by playing over specially composed songs or by playing their own tracks/songs or by playing in random selection mode. In this mode a number of operators could have a 'battle of the bands' competition against each other.

In another aspect of the invention, an operator uses the apparatus as a learning aid and has to strum to the correct tempo of the music as well as making different track selections and adding the proper effects at the right time.

In a further aspect of the invention, the apparatus is used as a controller to bring the operator through different levels of a custom designed computer game. The game plot could go through different levels of becoming a rock star such as going to music school, learning to play, forming a band, writing songs, playing gigs, getting a manager, recording in a studio, getting a record deal, releasing an album, designing CD sleeves, making a pop/rock video, animations/clips etc, competing in the charts and all the various stages could be conducted as a competition over the Internet.

In a still further aspect of the invention, an operator selects any guitar chord and plays it by strumming the strings wherein the chords can be laid down in sequence and allocated to different buttons or combinations of buttons. Most guitar players write songs initially as a sequence of Chords. There are numerous music books available to give the guitar tablature (Chords) for different music albums/styles. These could also be provided through the web.

The present invention is a combination of digital hardware and computer software program. It operates on mass market computer-based multimedia platforms, i.e. personal computers or games consoles such as Sony Playstation, Microsoft X-Box or Nintendo Dreamcast (APS Registered Trade Marks).

The invention uses a proprietary computer gaming peripheral as the input device. This is a digital device that produces a series of digital switch outputs plus a binary digital output waveform related to the intensity by which simulated guitar strings are plucked. The strings are solely used as a triggering mechanism. The string vibration times can be electrically adjusted by potentiometers connected to a retriggerable monostable on the control board of the peripherals. The peripheral includes switches to allow the user navigate and make selections on their interface screen. Additional switches are provided on the peripheral for special sound and effect selection.

The musical content for use with the invention can be any third-party generated audio-only music that can be played on a personal computer or games console. Typically this will be popular album releases. A separate playback track is recorded not as part of the original recording. The original recording remains intact including the target playback instrument. The separate track recording is 'packed' to ensure that it contains musical information even when the player hits the strings at the incorrect time.

The content also includes discrete soundbites (effects sounds, i.e. riffs, beats, loops etc. selectable by the switches on the peripheral) that can be triggered during the playback experience.

The delivery method for the instrument track is primarily internet based. Instrument playback soundtracks are prepared for selected popular album releases which users can download from a membership website. These digital sound files are delivered either as MP3 or WAV files. The original composite playback is typically sourced from pre-purchased CD album releases.

The invention utilises a digital time-slicing technique to control the volume of a pre-recorded instrument playback. A proprietary game input device generates a digital pulse for a user configurable time period. Two such digital signals are produced. One is produced when the game input device strings are plucked gently. When the strings are plucked more forcefully a second pulse signal is generated simultaneously although for a different time duration. In this manner, three possible instrument states are used: high, medium and off. These states are used to modify the instrument playback volume between these three states.

The invention is specifically a computer bases gaming solution. As such it requires a controlling computer software application. This software must perform the following tasks:

Input data – the gaming/digital input device connects to a personal computer or games console via the joystick or game port. The application must be able to read this data port.

Joystick/game port driver – to allow the application to read the joystick/game port, a unique and dedicated software driver is required. This is an interface between the user interface application, the computer operating system and the computer hardware. The driver monitors the digital state of the input device and passes this information to the user interface application.

User interface application – a series of computer screens are required that allow the user to launch the game experience, select different operating modes, choose the source music device, select a playalong track and assign digital sound effects files to effects buttons on the input instrument.

Synchronisation – a major concern of the computer program is to maintain synchronisation between the launch of the playback track and the source music device and to maintain this synchronisation during playback (source music may be delivered via CD or digital MP3 or WAV files).

Playback – the software program streams digital data packets (from source music, playback and effects files) to the internal sound card of the computer equipment. The relative volume and duration of these different data streams is controlled by the application relative to the inputs generated by the external gaming peripheral. Control and maintenance of the various data streams is a complex task requiring precise use and control of computer memory, hard disk, and sound peripherals.

The invention will now be described with reference to the accompanying drawings, which show, by way of example only, an interactive multimedia apparatus in accordance with the invention in which: -

Figure 1 is a pictorial representation of a first embodiment of interactive multimedia apparatus;

Figure 2 is a pictorial representation of a second embodiment of the interactive multimedia apparatus;

Figure 3 is a pictorial representation of a third embodiment of the interactive multimedia apparatus;

Figure 4 is a perspective view of a music simulation instrument provided in this case by a guitar;

Figure 5 is a front elevation view of the guitar of Figure 4;

Figure 6 is a side view of the guitar of Figures 4 and 5;

Figure 7 is a rear exploded perspective view of the guitar of Figures 4, 5 and 6;

Figure 8 is a schematic diagram of a section of the interface unit;

Figure 9 is a schematic diagram of the remaining section of the interface unit.

Figure 10 is a partly exploded perspective view a further embodiment of an interactive multi-media apparatus which can be used as a portable unit;

Figure 11 is a plan view of the assembled portable unit as shown in Figure 10; and

Figure 12 to 15 are two side views and two end views respectively of the portable unit.

Referring to the drawings and initially to Figure 1 there is shown an interactive multimedia apparatus indicated generally by the reference numeral 1. The apparatus 1 comprises a control unit provided by a PC 2 in this embodiment. The PC 2 can store any number of instrumental backing tracks in any desired file format on a hard drive and has I/O connections for a musical instrument provided by a guitar 3 in this embodiment. The PC 2 also has an I/O connection for audio-visual equipment provided by an audio unit 4 and Internet access via a modem 5.

Referring to the drawings and now to Figure 2 there is shown a second embodiment of an interactive multimedia apparatus indicated generally by the reference numeral 11. The apparatus 11 comprises a control unit provided by a set top box 12 having a facility to store instrumental backing tracks downloaded over a cable TV modem 13 in conjunction with a main original track. In synchronisation mode, the control unit receives a start-up signal from a main track playing on the audio-visual equipment 15 and electrical signals from the guitar 14. In response to the start-up signal the software of the control unit opens the backing track multi-media file and plays the file in mute mode in synchronisation with the main track. In response to electrical signals from the guitar 14, the software of the control unit generates an audible output signal from the multimedia file to the audio-visual equipment 15 in direct response to an input from the user of the guitar 14. In standard mode, no start-up signal is received by the software of the control unit and multimedia files stored on the control unit are opened and played in direct response to electrical signals from the guitar 14.

Referring to the drawings and now to Figure 3 there is shown a third embodiment of an interactive multimedia apparatus indicated generally by the reference numeral 21. The apparatus 21 comprises a control unit provided by a games console 22 having a facility to store instrumental backing tracks downloaded over a modem 23 in conjunction with a main original track. In synchronisation mode, the games console 22 receives a start-up signal from a main track playing on the audio-visual equipment 25 and electrical signals from the guitar 24. In response to the start-up signal the software of the console 22 opens the backing track multi-media file and plays the file in mute mode in synchronisation with the main track. In response to electrical signals from the guitar 24, the software of the console 22 generates an audible output signal from the multimedia file to the audio-visual equipment 25 in direct response to input from the user of the guitar 24. In standard mode, no start-up signal is received by the software of the console 22 and multimedia files stored on the console 22 are opened and played in direct response to electrical signals from the guitar 24.

Referring to the drawings and now to Figures 4 to 7, there is shown one embodiment of a music simulation instrument provided in this case by a guitar 41. The guitar 41 is provided with strings 42 and a transducer 43. A number of selection buttons 44 are provided in addition to a tremolo arm 45 for pitch bending and creating a tremolo effect. A volume control button 46 and a power indicating L.E.D. 47 are also provided on the guitar 41. Also shown in Figures 5 to 7, a control pad 48 is provided at the end of the arm 49 of the guitar 41.

In use, a user strums the guitar 41 and the strings 42 vibrate up through the transducer 43. The transducer 43 converts the mechanical vibrations to an electrical signal and forwards the electrical signal to an interface unit 83 (see Figures 8 and 9). The interface unit 83 transmits the signal to the control unit and in particular to the software stored thereon. In response to electrical signals from the guitar and/or start-up signals from a music source playing on audio-visual equipment the software opens a file containing a variety of sounds stored digitally. The software combines the sound file with the sound output from the main track using a sound mixer.

Additionally, if a user wishes to output sound from a different file, a selection button 44 must be pressed on the guitar 41. This in turn signals the software to open a different associated file. If a user wishes to hear a special effect on the melody he can move the arm 45 and volume control is achievable by twisting volume control buttons 46. When a user becomes tired of the various files that they have downloaded onto the control unit, they may select a different collection of files using the control pad 48 in conjunction with a user interface screen displayed on the visual display. A user can directly access the internet using the guitar 41 as a means for navigation.

Referring to the drawings and now to Figure 8, there is shown a schematic diagram for a section of the interface box indicated generally by the reference numeral 81. A magnetic pickup 83 connects the music simulation instrument to the input port/ joystick port of a P.C. or games board. The magnetic pickup 83 uses a standard magnetic coil 82 and the movement of the metal strings 42 change the magnetic field of the magnetic coil 82 inducing an electromotive force (e.m.f.) in the coil surrounding the magnet. The signal is presented to a high gain operational amplifier 84 and passed on to two level detectors 85 and 86. When one predetermined voltage is reached in response to a certain force being applied to the strings 42 by an operator, level detector 85 switches and provides an input to the monostable 87. The output 90 from the monostable 87 goes to zero and turns the green L.E.D. 88 on resulting in pin 2 going to zero volts.

When the operational amplifier 84 sends a higher voltage to the level detectors 85 and 86, detector 86 switches and provides a signal to the monostable 87. The output 90 of the monostable 87 goes from five volts to zero volts and the red L.E.D. 89 comes on resulting in pin 7 going to zero volts. The P.C. or games board constantly monitors the values of the input on the joystick port by means of the bios. The software provided for the guitar reads the values stored in RAM by the bios and provides a relevant response, which in relation to pin numbers 2 and 7 is an audible sound. The length of the sound played depends on the reset time of the monostable 87 which is controllable by adjusting variable resistor 103. Additionally, the control system used to damp the vibration of the strings 42 can also effect the duration of the sound produced in response to an operator strumming the strings 42.

Referring to the drawings and now to Figure 9, there is shown a schematic diagram for the remaining section of the circuitry connecting the switches on the guitar 41 to the P.C. or games console. Switches 91 to 94 correspond to the four positions of the control pad 48 whereby pressing of any of the four switches alters the value of resistance on pin 3 of the 15 pin D-plug which is seen by the bios via the input port. Pressing switch 91 or 92 shorts out the associated resistors whereas pressing switch 93 or 94 switches in the associated resistors respectively. The bios of the P.C. monitors the value of resistance at pin 3 and stores the value in RAM. The software provided for the guitar interface accesses the values stored in RAM to locate a cursor on the mask of the software interface. The input from pin 3 is effectively the x value of a standard XY co-ordinate system used to locate a cursor on the screen of a monitor.

Switches 96, 97, 98 and 99 correspond to the selection buttons 44 on the shaft of the guitar 41 and operate in the same way as the switches 91 to 94. The value of resistance provided at pin 6 is recorded by the bios of the P.C. and is interpreted by the software provided for the guitar interface. The value provided by pin 6 is associated with a y co-ordinate when the port is used with a standard joystick and can be used in a similar way with the guitar 41. The variable resistors 101 and 102 correspond to the volume control knob 46 and the wow handle 45. Again, the bios of the P.C. reads the value of resistance provided by the two variable resistors 101, 102 and the software interprets the value to provide an audible output at the selected volume or pitch. Switches 105, 110 and 111 are recognised by the software on the control unit as special effects switches and can be assigned a variety of functions. The fuse 115 protects the control unit from any faults that may occur on the guitar 41. Customized driver software is also provided with the instrument in order to avoid the need for calibration.

Referring to Figures 10 to 15, the portable unit 100 includes the features of the other embodiments and can be used with headphones or miniature speakers (not shown) which can be plugged into outlet port 101. The portable unit 100 has a guitar like device which includes strings 142 and a transducer 143. Selection buttons 144, special effects controls 148 and volume control 146 enables the user to control the output and effects generated by playing the device in conjunction with a CD playing in the CD holder 150. A clip 160

enables the portable unit 100 to be attached to a user's belt or clothing who can play the unit at whatever location he or she wishes.

A further embodiment of this invention will be outlined in the following illustrations and explanations.

The further embodiment of this invention is a USB (Universal Serial Bus) implementation of the interface hardware for the Interactive Multimedia Device, combined with a custom-designed suite of software running on a controlling device, which will provide the user with the facility to play the full range of instrumental chords by selection of pre-assigned control members and the simultaneous activation of an individual control member string or a plurality of string control members. This further embodiment of the invention will allow non-musical trained users to compose, accompany, solo, gig and have fun as if they were an accomplished instrument player.

Additionally the invention will assist users in developing a knowledge of chord structures, complex chord structures, scales and the location of notes on the fret of a stringed instrument.

This invention allows users to not only dynamically apply global effect parameters to a selected note or chord, but will allow users to select, control and adjust any individual or group of parameters which make-up the component parameters of the selected special effect generator.

Figure 13 (i) and Figure 13 (ii) show the schematic drawings for the USB (Universal Serial Bus) Interactive Multimedia device. The explanation of the circuit and its operation are as follows:

The GUITAR product is a USB low speed (1.5 Mhz) BUS POWERED device.
It has 10 pushbutton switches, 1 optoswitch /red LED pair .
It is connected to the PC via a 3m 4core screened cable.

Schematic Description

Power

The GUITAR product receives its +5 volts power from the PC via USB connector CN1.

The maximum current drawn will be approx. 50mA.

Hardware reset

When power is first applied the CPU will be reset by 2 off 0.1uF capacitors and 10k resistor combination .

Suspend Mode

All USB devices must support suspend mode.

Suspend mode enables the device to enter a low power mode if no activity is detected for more than 3mS.

Any bus activity will keep the device out of the suspend state

When the device is in suspend mode it must draw less than 500uA. CPU Ports A and C are configured as outputs, and set to high, when entering suspend mode because as inputs each pin of ports A and C will draw 50uA due to the internal pullup resistors on these ports.

CPU Port B does not contain any internal pullup resistors but external pullup resistors are implemented in hardware at the optocoupler photo transistor output.

Thus all port B CPU pins should be configured as outputs and set to high applied before entering Suspend mode.

Disabling the Analog to Digital convertor will save some current in suspend mode.

In suspend mode the current drawn by Guitar must be less than 500uA.

Entering suspend mode

1. Make PA1 output high

2. Make PA2 output high

3. Make the following port pins outputs and HIGH

PA0,PA3,PA4,PA5,PA6,PA7,PB0,PB1,PB2,PB3,PB5,PB6,PB7,PC0,PC1,PC2

Note: leave PB4 as an input always

Exiting suspend mode

The product can be woken up from suspend mode by switching the bus state to the resume state ,by normal bus activity,by signalling a reset or by an external interrupt.

During suspend mode the internal CPU oscillator is turned off.

In this state the CPU will not be able to detect key presses.

Leaving suspend mode

1. Make the following port pins Inputs PA0,PA3,PA4,PA5,PA6,PA7,PB0,PB1,PB2,PB3,PB4,PB5,PB6,PB7,PC0,PC1,PC2 2. Make PA2 output LOW

3. Make PA1 output LOW

Guitar will only be in suspend mode when:-

a)When not configured in the PC

b)When told to do so by the PC

c)When there is no bus activity

CPU (U1)

The CPU (U1) is a ST7263 manufactured by ST Microelectronics.

The CPU version is a surface mounted type called ST72T631K4M1

The CPU clock is set by a 24 Mhz crystal (A)

Switches SW1 to SW12

There are a total of 12 push button switches (normally open) connected to the CPU.

Each switch is monitored by 1 separate input.

Each input is joined to +5volts via a pullup resistor.

When a switch is pressed the input will drop from +5volts to 0 volts.

Opto Switch OPT1 and LED1

OPT1 is a phototransistor which is switched on when LED1 (red LED)is on.

LED1 shines light on OPT1.

OPT1 is switched off by cutting the light beam with your thumb.

U2

This IC protects the CPU from any spurious signals picked up by the external wire.

USB004 is a Chinese recommended part.

U3

This IC is a low power Op amp TS931 ILT. (ST Microelectronics).

It is used to amplify the signal from the magnetic pickup.

J1 and J2 (3.5mm Jack sockets)

J1 or J2 allow for an input from a standard variable resistor foot pedal.

The middle connection is the wiper of the potentiometer.

a typical value for this potentiometer is approx. 22 k ohms

Bill of Materials

Qty	Description	
1	SMT resistor 1.5 ohm	0.125w 5% tolerance
1	SMT resistor 150 ohm	0.25 w 5% tolerance
5	SMT resistor 330 ohm	0.125w 5% tolerance
3	SMT resistor 1k5	0.125w 5% tolerance
14	SMT resistor 4k7	0.125w 5% tolerance
2	SMT resistor 10k	0.125w 5% tolerance
1	SMT resistor 22k	0.125w 5% tolerance
1	SMT resistor 150k	0.125w 5% tolerance
2	SMT resistor 220k	0.125w 5% tolerance
1	SMT resistor 1Mohm	0.125w 5% tolerance

1 47k potentiometer (VR1) 10% tolerance

2 SMT capacitor 33pF ceramic 50v 5% tolerance

5 SMT capacitor 0.1uF ceramic 23v 10% tolerance

1 SMT capacitor 0.47uF ceramic 16v 10% tolerance

2 SMT capacitor 10uF 16v tantulum or aluminium electrolytic

1 Red LED 204SRC/E

1 opto transistor (OPT1)PT928-6C

1 SMT 24mHz crystal AEL CM309S

2 1N914 diodes

1 CPU (U1) ST Microelectronics ST72F63BK4M1
(SMT Shrink package SO34 ,300mil width)

1 protection chip (U2) USB004
(SMT package)

1 op amp TS931 ILT (ST Microelectronics)

12 SMT switches (normally open) Omron B3S-1000

1 Magnetic pickup

1 USB screened cable 3metres long with series 'A' Plug

Port No.s for the Guitar

	PORT	PIN NO. (PACKAGE IS SO34)	INTERRUPT	INTERNAL PULLUP RESISTOR	TYPE OF SIGNAL	COMMENT
4 Switches at bottom (Bottom is SW1 , Top is SW4						
SW1	PA0	29(Input)	no	pullup res.	Hi or Lo	0 means key is

						pressed
SW2	PA3	23(Input)	no	pullup res.	Hi or Lo	0 means key is pressed
SW3	PA4	22(Input)	Ext. Int Lo to Hi	pullup res.	Hi or Lo	0 means key is pressed
SW4	PA5	21(Input)	Ext. Int Lo to Hi	pullup res.	Hi or Lo	0 means key is pressed
8 Switches on neck Bottom is SW5 top is SW12						
SW5	PA6	20(Input)	Ext. Int Hi to Lo	pullup res.	Hi or Lo	0 means key is pressed
SW6	PA7	19(Input)	Ext. Int Hi to Lo	pullup res.	Hi or Lo	0 means key is pressed
SW7	PB2	16(Input)	no	no	Hi or Lo	0 means key is pressed
SW8	PB7	10(Input)	Ext. Int Hi to Lo	no	Hi or Lo	0 means key is pressed
SW9	PC0	7(Input)	no	pullup res.	Hi or Lo	0 means key is pressed
SW10	PC1	6(Input)	no	pullup res.	Hi or Lo	0 means key is pressed
SW11	PC2	5(Input)				0 means key is pressed
SW12	PB6	11 (Input)	Ext. Int Hi to Lo	no	Hi or Lo	0 means key is pressed
Ground pin for all 12 Switches and opto device SW1 to SW12 and opt1	PA1	28 (Output) (25mA port)	no	pullup res.	Hi or Lo	*Set to 0 to allow all switches SW1 to SW12 and opto1 to be detected Set to 1 in suspend mode*
Red LED2 for OPT1	PA2	24 (Output) (25mA port)	no	no	Hi or Lo	Set to 0 to light LED
OPT1	PB0	18(Input)	no	no	Hi or Lo	1 means light is blocked

VR1 pot (Wow pot)	PB3	15(Input)	no	no	analog i/p	
From Amplifier U3	PB4	14 (Input)	Ext. Int Lo to Hi	no	analog i/p	
3.5mm Jack socket (J1) for Foot pedal 1	PB1	17 (Input)	no	no	analog i/p	
3.5mm Jack socket (J2) for Foot pedal 2	PB5	12(Input)	Ext. Int Lo to Hi	no	analog i/p	

The above schematics and explanation are shown for example purposes only and the invention is not limited in its scope by the operation of the schematic design, the components used or the specification or capabilities of the components or the range of additional peripheral devices which could be added to the design. The design is not limited to the number of control members (switches) or magnetic pick-ups, lights etc. shown in these schematics.

Particular attention should be drawn to Figure 13 (ii) Label K (magnetic pick-up). The schematic shows the circuit for a standard multi-pole transducer (magnetic pick-up) which provides a single output energy source irrespective of the fact that one or any combination of strings are activated within its magnetic field. This invention uniquely specifies the use of a plurality of individual, uncoupled, isolated transducers that will only be energised by the activation of the individual string directly within that transducer's magnetic field effect.

Each transducer output would be connected to a separate pin on the CPU, in a similar fashion to that described in the schematic Figure 13 (i) and Figure 13 (ii), which are shown as example only. The CPU would perform an analogue to digital conversion (A/D) on the sampled input. In the situation where sufficient A/D resources are not available on the CPU an external A/D converter would be required. Another alternative would be to bank switch groups of inputs, be they analogue (e.g. Transducer output) or digital (e.g. Push button). For example, assuming there is a requirement to read 16 analogue inputs, these inputs could be connected to a multiplexing device whose 8 output pins are connected to the CPU. Another pin from the CPU would control (bank switch) which bank of 8 inputs are directed to the CPU.

The two foot-pedal jack sockets shown in Figure 13(ii) and described in the schematic workings will allow users to dynamically modify a variable control, for example volume, pan or special effect parameters controls as described later in this application.

The individual transducers (magnetic pick-ups) are the preferred method of detecting string vibrations. The invention is not limited to the use of magnetic detection method only, as opto-detection methods, pressure sensing, movement detection et al. could also provide acceptable solutions for vibration, time and amplitude sensing.

Preferably the Interactive Multimedia Device, see Figure 5 as an example, would include a series of coloured LED lights under each string, located at the neck end. The software would activate the lights under the individual strings which make up the selected chord, so that the user will be notified of the correct strings to strum and if they so wish, they can pick the individual notes of the selected chord. This component of the application will be dealt with in more detail later in this application.

In this embodiment the use of the invention may be as follows;

Usually chords are played on a stringed instrument by the placement of the user's fingers on the selected strings in the appropriate section of the fret on the neck piece and then the user activates the strings in a manner that produces the desired sound output of intensity and vibration duration, speed and tempo. The user may strum, pick, strum up, strum down, strum and pick, pick between selected strings etc. to achieve their desired results. The correct fingering position on the fret for each string is a critical component in the generation of each note in the overall chord structure.

Asian Pacific, European and USA music compositions use 3 note chords extensively, with the more accomplished, creative and dynamic instrumentalists using more complex chord combinations of 4, 5 and 6 notes to provide a more complete and colourful signature to their playing. 3 note chords can also have many combinations of individual notes from within its own scale, which provide the user with a rich palate of chords from which to select.

If we take as an example only, the 'C Chord';
The diatonic C scale is as follows:

C	$C^{\#}$	D	$D^{\#}$	E	F	$F^{\#}$	G	$G^{\#}$	A	$A^{\#}$	B	C
	D^{b}		E^{b}			G^{b}		A^{b}		B^{b}		

D^{b} is the same note as $C^{\#}$ and the other *b*(flat) notes are the equivalent of the # (sharp) notes.

The three note chords or triads for the C scale are C, E, G; for Cm they are C, E^{b} , G , for CSus4 they are C, F, G,; for Cm65 they are C, E^{b} , G^{b} ; for C+ they are C, E, $G^{\#}$. It is obvious that for each note there is a multiplicity of chord associations for the user to create or select from. It is nearly impossible for the non-accomplished user to create the more complex chords, particularly those using 4, 5 or 6 note combinations.

Many users with limited experience and training have been able to create simple compositions using 3 chords variations. They can use the chords of the root note of that key and the chords of the fourth and fifth notes of the scale of the root note. Limiting the creative and entertaining experience to 3 or a small number of chord combinations is most frustrating and irritating to users. To progress beyond the simple "3 chord trick" combination requires a lot of learning and practice with fret fingering etc. This invention eliminates the complexity of correct fret fingering, simple chord creation, complex chord creation, learning note combinations associated for simple and complex chords etc. Additionally this invention will quickly teach the user if they wish to learn, the correct notes associated with each chord they select and moreover the user is shown which string has triggered each note of the selected chord.

This invention allows users to quickly create and play an unlimited number of combinations of simple and complex chords, where each note of the chord is played at its correct interval in the chord structure as it would be played by an accomplished user of a stringed instrument.

The chord generation and note rendering methodology for string-based instruments and that of keyboard-based instruments differ greatly. With keyboard-based instruments, the user usually plays a chord by simultaneously depressing the keys of the associated notes of the chord. It is not normally possible for the user of a stringed instrument to strum or to pick each note of a chord simultaneously whilst fingering the notes on the fret. This is because there is a time difference interval between the triggering of each note of the chord. This invention allows for this time difference interval, as the chord database contains the correct location of each note of the selected chord and then assigns each note to the correct string position on the interactive multimedia device. Therefore, as each individual transducer's energy level is detected for each string activation, the individual notes of the chords are played as the corresponding string is activated. In this way the user is provided with a true simulation of an accomplished player's experience.

The LED visual displays under each string will be energised by the application software to indicate to the user the active strings for the selected chord. The provision of the LED display is to allow users to visibly see the different note assignments for each chord combination. The software can apply appropriate notes to the unassigned strings to simulate the sounds that these unassigned strings would make if the user wishes to strike across the whole of the string area in a violent action similar to the action of their hard-rock idols. The user can chose from a set-up menu, whether they wish to configure the device for violent actions and have the software automatically trigger the correct sounds for the unassigned strings.

The activation of the strings resulting from the user actions will be interpreted by the software to produce a sound output that truly reflects the user's striking actions.

The user experiences described above are achieved using the techniques described as follows:

In this embodiment, the Interactive Multimedia Device may have 12 control members, refer to Figure 5, 44, which shows only 4 control members as an example only, and any number of additional control members for other assignments.

The transducer (magnetic pick-up) specified in this application will comprise 6 in number (as example only and not limited to this number) individual, uncoupled and electrically isolated transducers, which provides for 6 separate electrical outputs as a response to the user's activation of the individual string vibrating with its associated magnetic field.

For example purposes only we will describe how the user will interact with the software to simulate similar results to those achieved by an accomplished instrumentalist.

Accordingly there is provided a database of recorded instrument notes played over a two octave range using a plurality of stringed instrument types. Preferably the notes will be generated in a wav format for purity of sound reproduction and to reflect more exactly the tonal quality of the various instruments recorded. A chord database is provided which contains the note associations for a very wide range of defined chord structures. The users, if they so wish, can additionally create their own bespoke chords, by selecting an association of notes and defining their string associations.

This chord database will provide all the note associations for a very wide selection of known chord definitions and structures. To simulate the playing of a stringed instrument using an Interactive Multimedia Device and its associated software application programme, demands the faithful reproduction of the selected instrument sound in complete and total harmony and sympathy with the user's actions. It is imperative that the chord database contains the exact string assignment for each note in the chord so that the action of strumming or picking the chord will trigger the notes in the correct order, that they were played by the user. In this invention, the database which has been created contains the note associations and the string assignments for each chord contained in the database. Additionally, by user selection, the chord database may assign complimentary and sympathetic notes, one octave or more adjusted, to any or all of the unassigned strings. The assignment of sympathetic notes, one octave or more adjusted from the root chord note, to unassigned strings, will provide a more colourful and verbose chord renderings.

Accordingly, if the user wishes to play a chord, for example the chord 'C', the user would firstly select the instrument file as shown in Figure 15 Label A and then select the chord

'C' from the chord database for the selected instrument type, see Figure 14 Label A. The user would then be presented with a drop down menu of all the C chord variations held in the database, for example purposes only see Figure 14 Label A. The user may wish to select the major chord, Figure 14 Label B, which contains the notes C, E, G. The chosen chord must then be assigned to a control member, see Figure 5 Label 44, which will select that chord when the user activates that control member. The chord assigned to that control member will be played by the software when the user activates the strings of the Interactive Multimedia Device. The software will have automatically assigned the notes of the selected chord to the appropriate strings of the interactive multimedia device so that the individual transducer associated with each string will detect the user's actions in striking the string and provide an audio output for the associated assigned note that will faithfully represent the response to the user's actions.

String assignments for the Simple D major chord would be String 1, Note $F^{\#}$; String 2, Note D and String 3, Note A. If the user has pre-selected the option to apply an additional raised octave note, then the software will add a further note 'D' to the 4^{th} String.

The user can assign chords and special effects to the control members, which for example purposes only will be illustrated as follows; the user will select from a window, see Figure 16 Label A, the particular chord they wish to assign to a control member. The user is then presented with a menu as shown in Figure 17. The user must select the device type from a plurality of devices, as shown in Figure 17 Label A. For example purposes only we show a guitar-type device called the 'PikAx' in Figure 17 Label A. The user must then select the device number they wish to be configured, see Figure 17 Label B. This application allows for a plurality of devices in each class of device and for a plurality of different device classes. The user will then select from a drop-down menu, see Figure 17 label C, containing various control member identifier options. The user specifies which control member they wish to assign the selected chord to. For example purposes only, we show in Figure 17 Label C, the control member being identified as Switch 10, See Figure 5, Label 44. The user will then select the electrical state the control member must reach to be in the state of assertion for the selection of the assigned chord, as shown for example purposes only in Figure 18 Label A. The drop-down menu as show in Figure 18 Label A illustrates

for example purposes only, four conditions of assertion – 'when pressed', 'when released', 'while pressed' and 'while released'. The user will then select the triggering method for the control member, see Figure 18 Label B, which when asserted will provide the stimulus to the software to play the notes of the chord in direct response to the software's interpretation of the control members vibrations or activations. In some device class types, the activation source may not be a vibrating mechanism, but some other pressure sensing device, an opto-coupled device or any other mechanism, which provides an electrical output in response to a user's actions.

In this example we show in Figure 18 Label B that a magnetic pick-up is the selected activation device for triggering the notes of the assigned chord. The user may wish to adjust various effects, controls, characteristics or parameters of the sound output by using either a fixed or adjustable control member. In Figure 19, we show for example purposes only, a limited range of controls that the user may wish to adjust dynamically by using one of the proportional control members shown in Figure 23 Label A or by using any of the fixed control members shown in Figure 17 Label C. The user may wish to increase the output volume, see Figure 19 Label A; the pan control, see Figure 19 Label B; the tempo, see Figure 19 Label C or any other control or parameter they may consider is desirable to adjust dynamically. In this example, for a fixed control member, the user will assign the selected control member for the control adjustment by selecting from the drop-down menu, Figure 19 Label B and then selecting the assertion state for that control member Figure 19, Label E and then selecting the percentage adjustment they wish to apply, Figure 19 Label F and also the rate of change in milliseconds at which they wish to apply the change, Figure 19 Label G. Similarly to reduce the volume, pan, and tempo etc. the user selects and assigns the controls as shown in Figure 19 Label H, J, K, L.

When using an adjustable control member, the user will select and assign the appropriate control members, Figure 19, Label M, N, P. The user may wish to mute the output by selecting and assigning the control member and their assertion states, see Figure 19 Label R and S. The user may wish to restore the original settings by selecting and assigning a control member, see Figure 19 Label T and V. Another significant and unique component of this application is the ability of the software to dynamically and in real time, adjusts the

individual parameters of a special effect, which is being applied to an individual note or notes of the selected chord, while it is being played by the controlling device. In this application and for example purposes only, we show in Figure 20 Label A, a range of special effect choices from which the user may select and which they may apply dynamically to a chord or note or a combination of notes. In this example, we show that the user has selected 'flanger', see Figure 20 Label B. Figure 21 shows, as example only, some of the key parameter adjustments that affect the generation of the 'flanger' special effect. The user may adjust any or all of these parameters to provide a composite sound effect of their choice. Additionally the user may wish to dynamically adjust in real-time during their playing activity any or all of the individual parameters to create contrasting sound effects. The user sets the individual slider controls for each parameter as in Figure 21 to provide the composite sound effect results they desire. The user will then assign the parameters they wish to adjust dynamically and in real-time as follows; the user wishes to adjust a parameter of the 'flanger' special effect and to have the selected parameter immediately activated in response to their operation of an adjustable control member. Figure 22 Label A shows a selection box, which when selected will tell the software to automatically apply the adjustments when the selected control member is activated. Figure 22 Label B shows a drop-down menu containing the individual parameters of the special effect being applied as in Figure 21. The user selects the individual parameter they wish to dynamically adjust and in this example it is the frequency. The user will then assign the adjustable control member they desire as the trigger mechanism, see Figure 23 Label A. In this example, it is a foot-pedal. Additionally there is allowance, as in Figure 23 Label B, for the user to select a minimum threshold level before the adjustable control member kicks in. Setting this minimum threshold level in the activation of the parameter adjustment allows for differing tolerances in the electrical properties of proportional potentiometers and other proportional measurement devices.

When the user activates the selected triggering device, which in this example is a foot-pedal, beyond the minimum threshold level of 5%, then the software will adjust the frequency parameter of the effect in sympathy with the movement of the proportional control member.

Additionally there is provided further embodiments of this invention, which provides an entertaining, but less challenging and less educational experience for the user. In this further embodiment, the chords would be played by the software in response to the user striking any of the strings of the Interactive Multimedia device, in any sequence of strumming, picking etc. In this further embodiment, the notes of the chords are not played as a response to the individual string activations as described in the earlier embodiment. This embodiment may be a starting position of choice for beginners, who would quickly progress to the more advanced embodiment as described earlier in this application. In this embodiment, the user must select the preferred tempo they wish to use. The software will trigger the playing of the notes of the selected chord at time intervals appropriate to the selected tempo.

Additionally, the chord database is not restricted to the notes of a variety of string instrument types. The chord database could include notes, chords or sounds from any instrument type or from any percussion type instrument or from any wind-based instrument or from any reed-based instrument or from any instrument that is activated by a bow movement or from any device that comes within the classification of a musical instrument, which would be played as either individual notes, chords or sounds or combination of sounds by user selection. This invention is not limited in any way by the examples provided in this application or to the instrument types or to the method of application or stimulation.

It is to be understood that the invention is not limited to the specific details described above which are given by way of example only and that various modifications and alterations are possible without departing from the invention

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Applicant's Agents
47 Merrion Square
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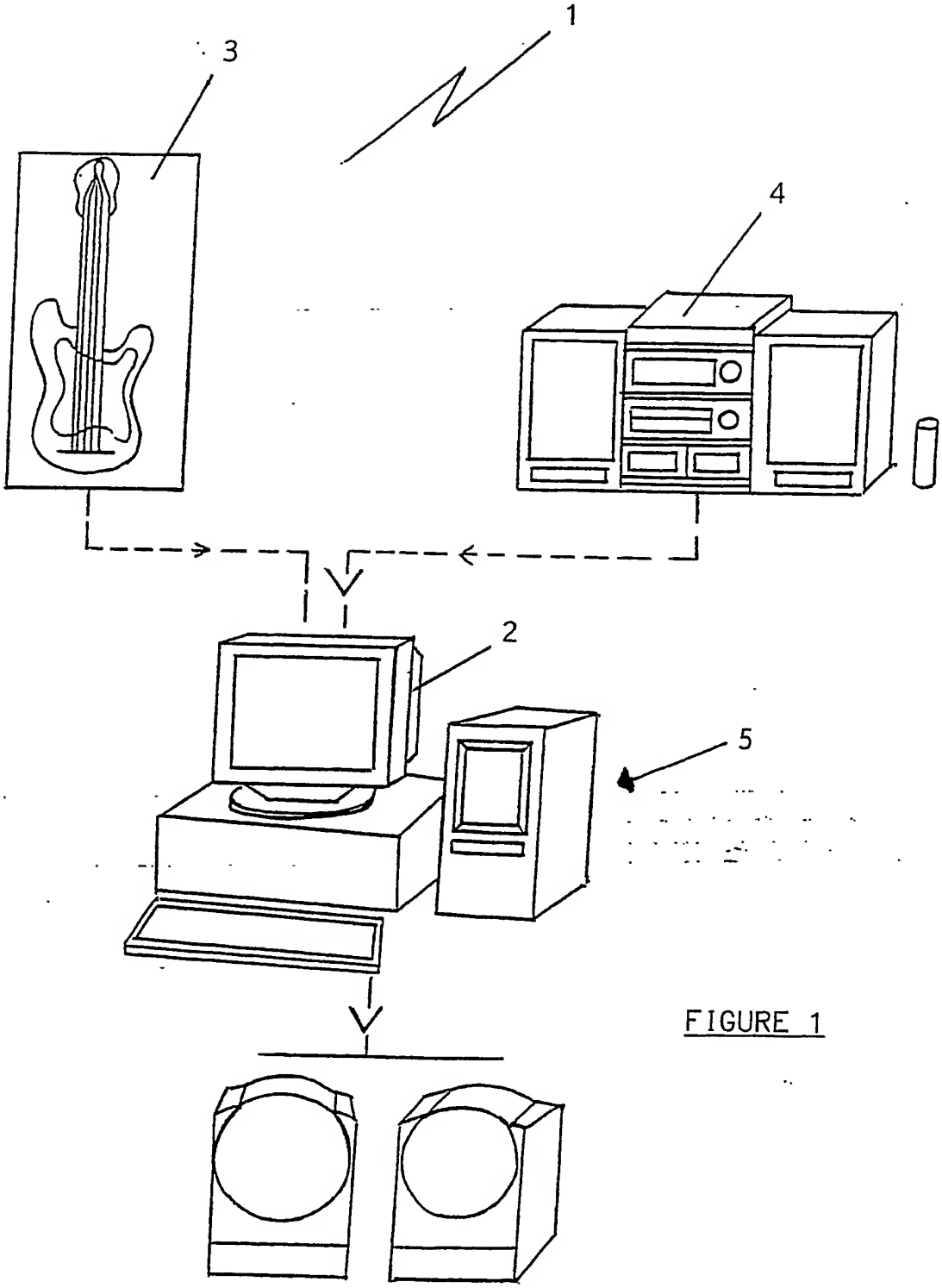


FIGURE 1

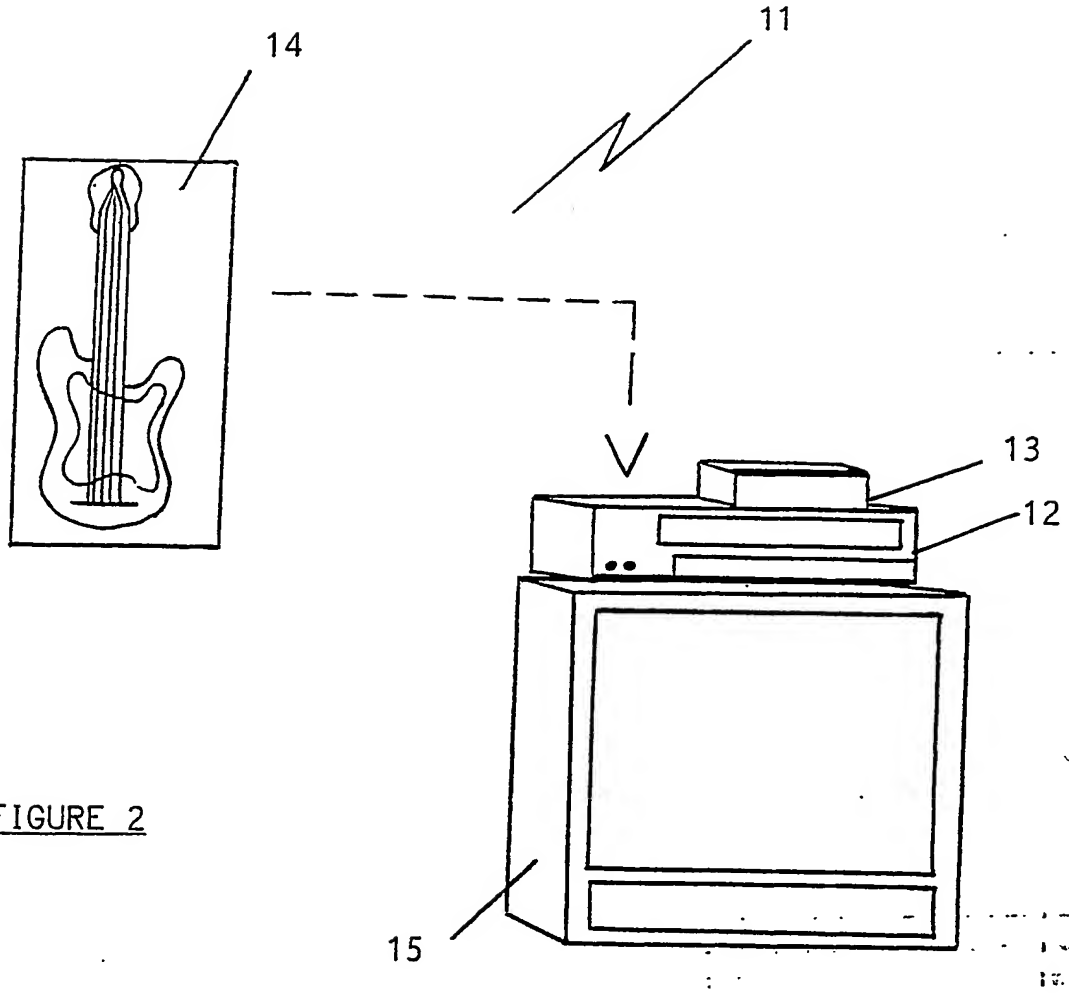


FIGURE 2

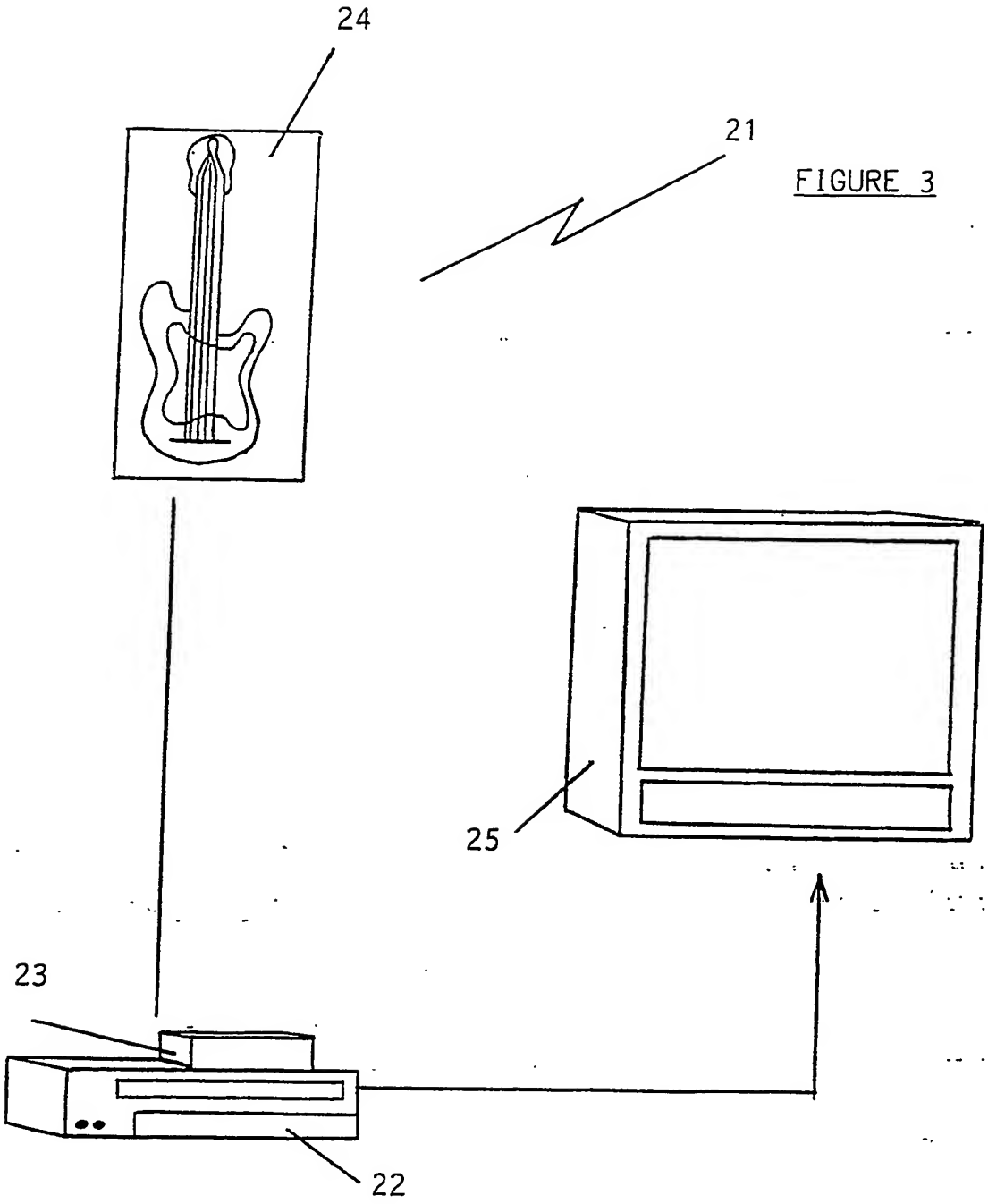


FIGURE 3

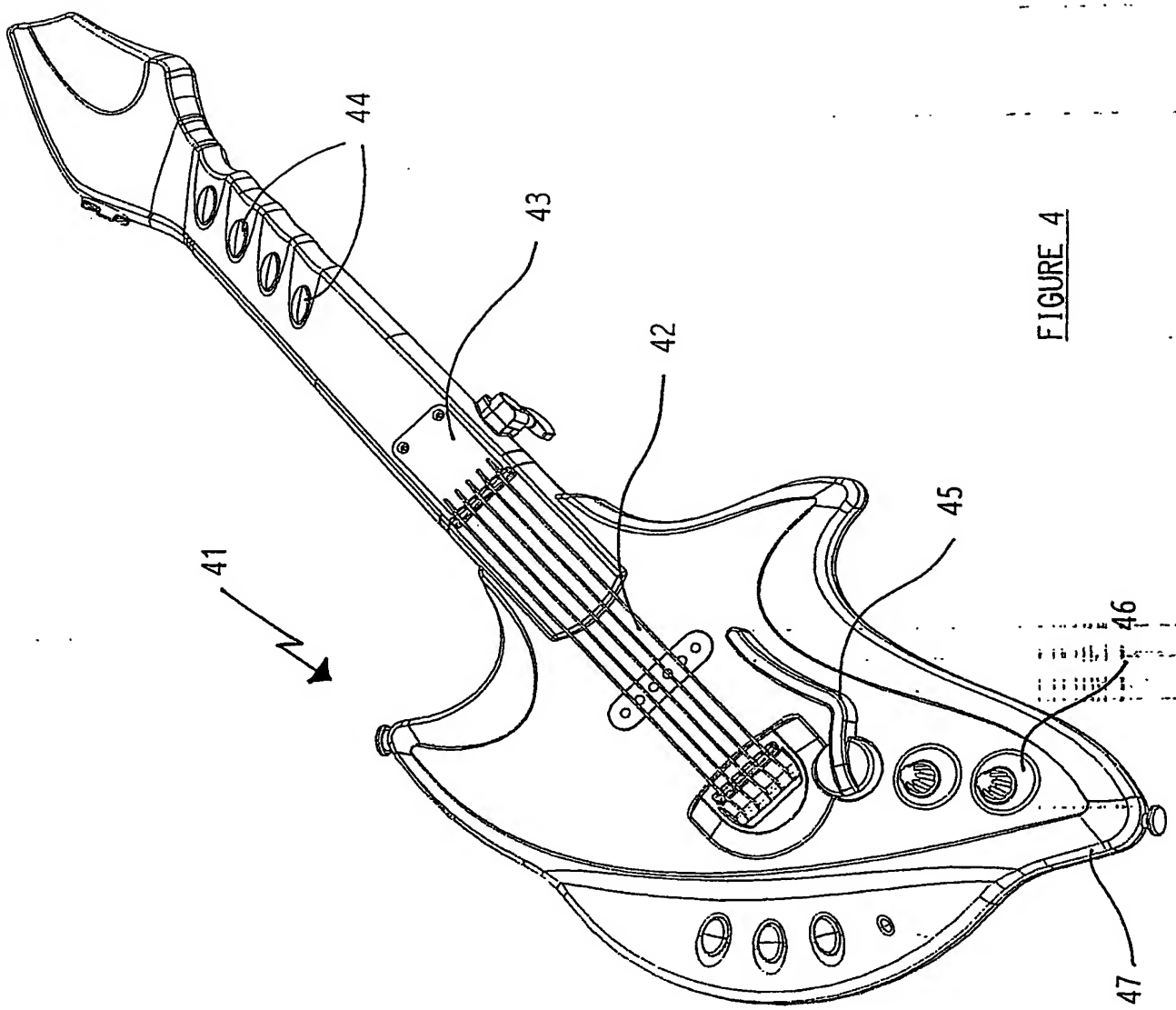


FIGURE 4

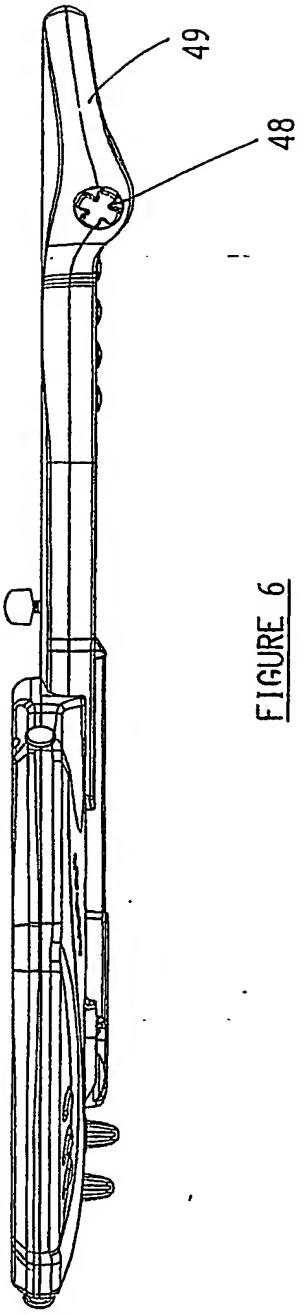


FIGURE 6

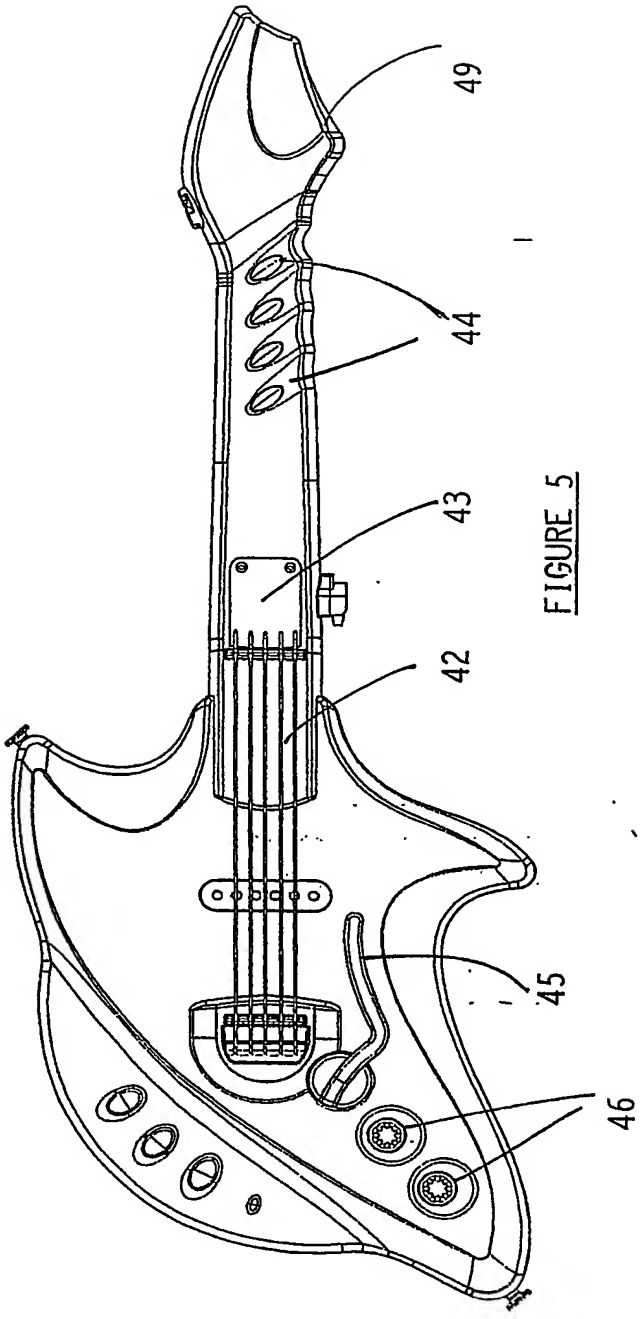


FIGURE 5

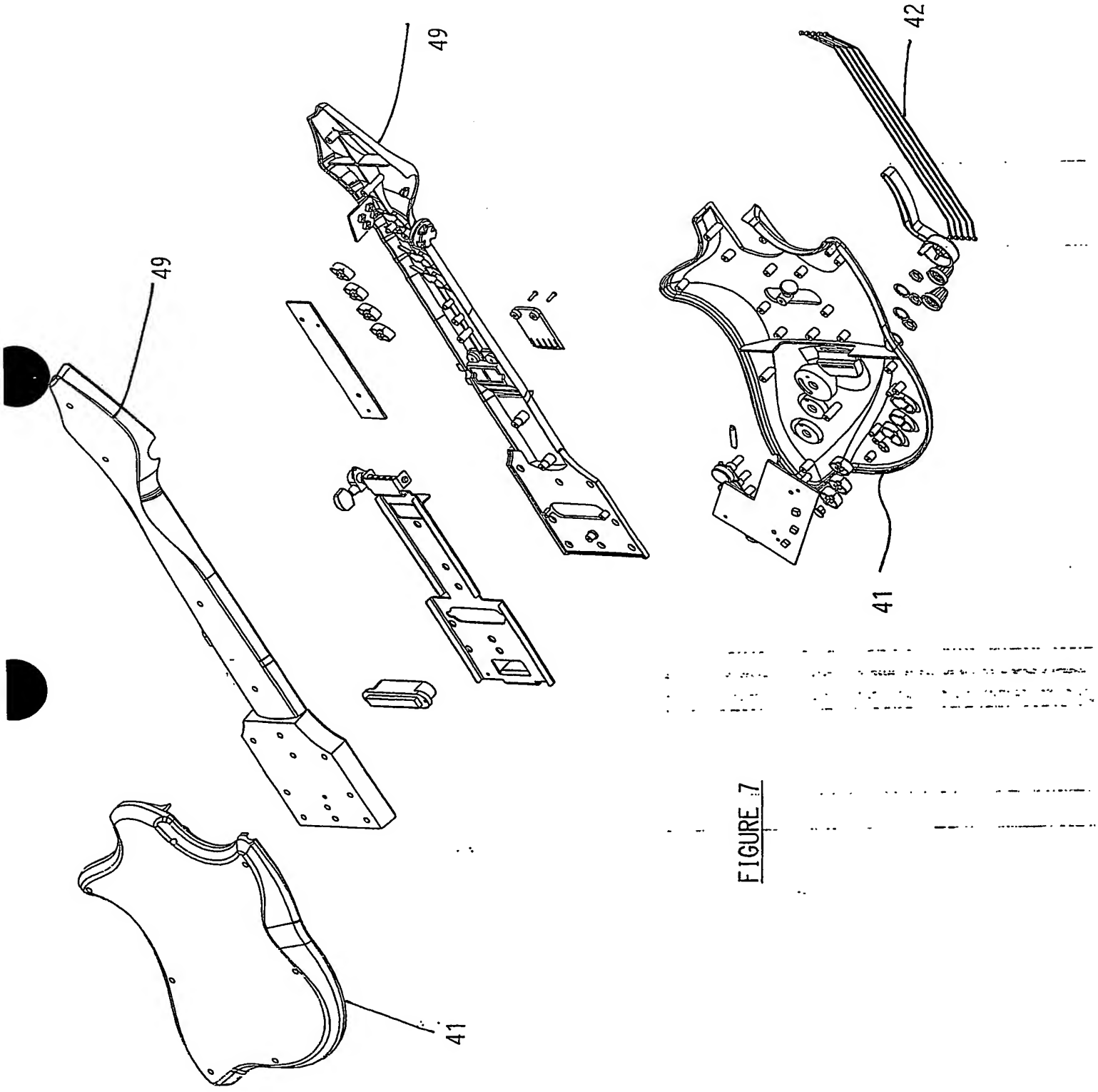


FIGURE 7

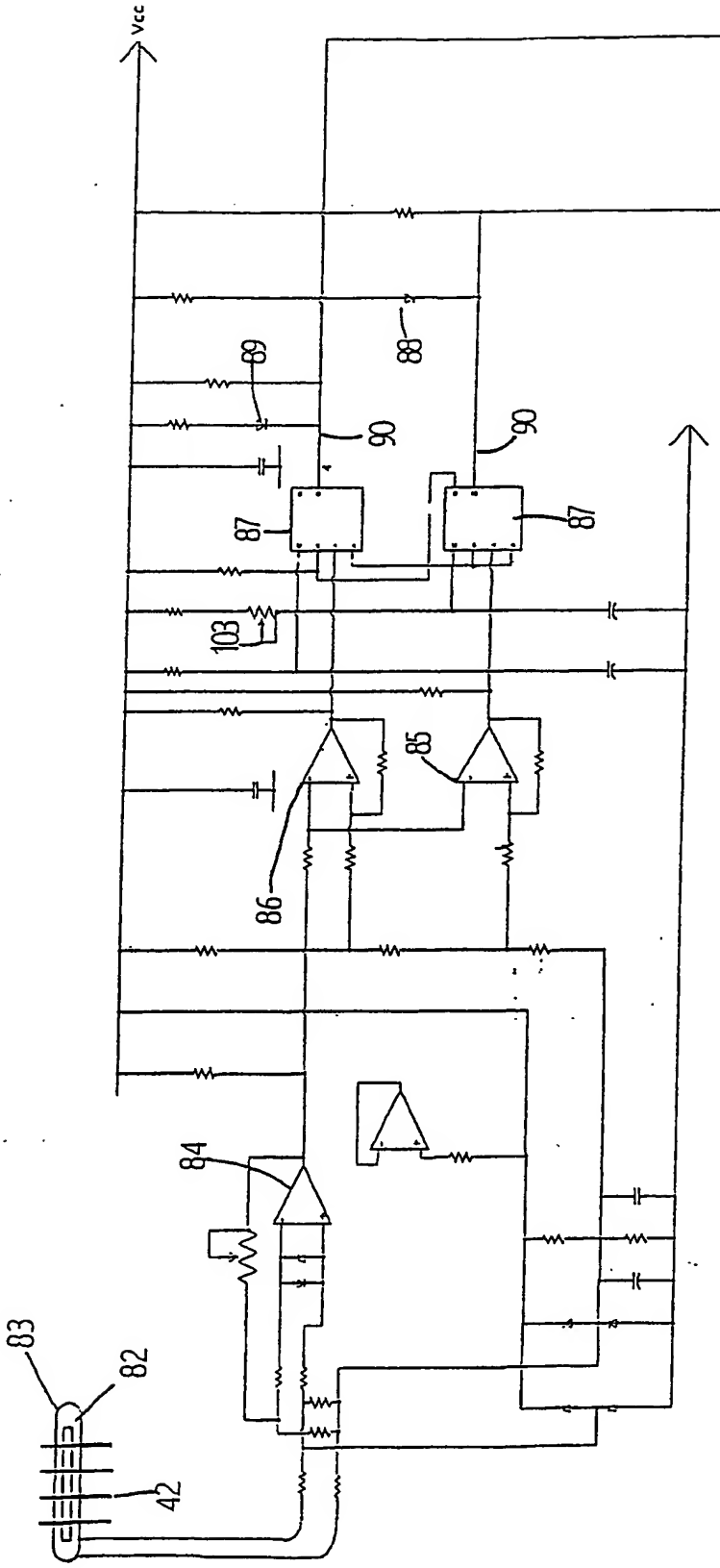
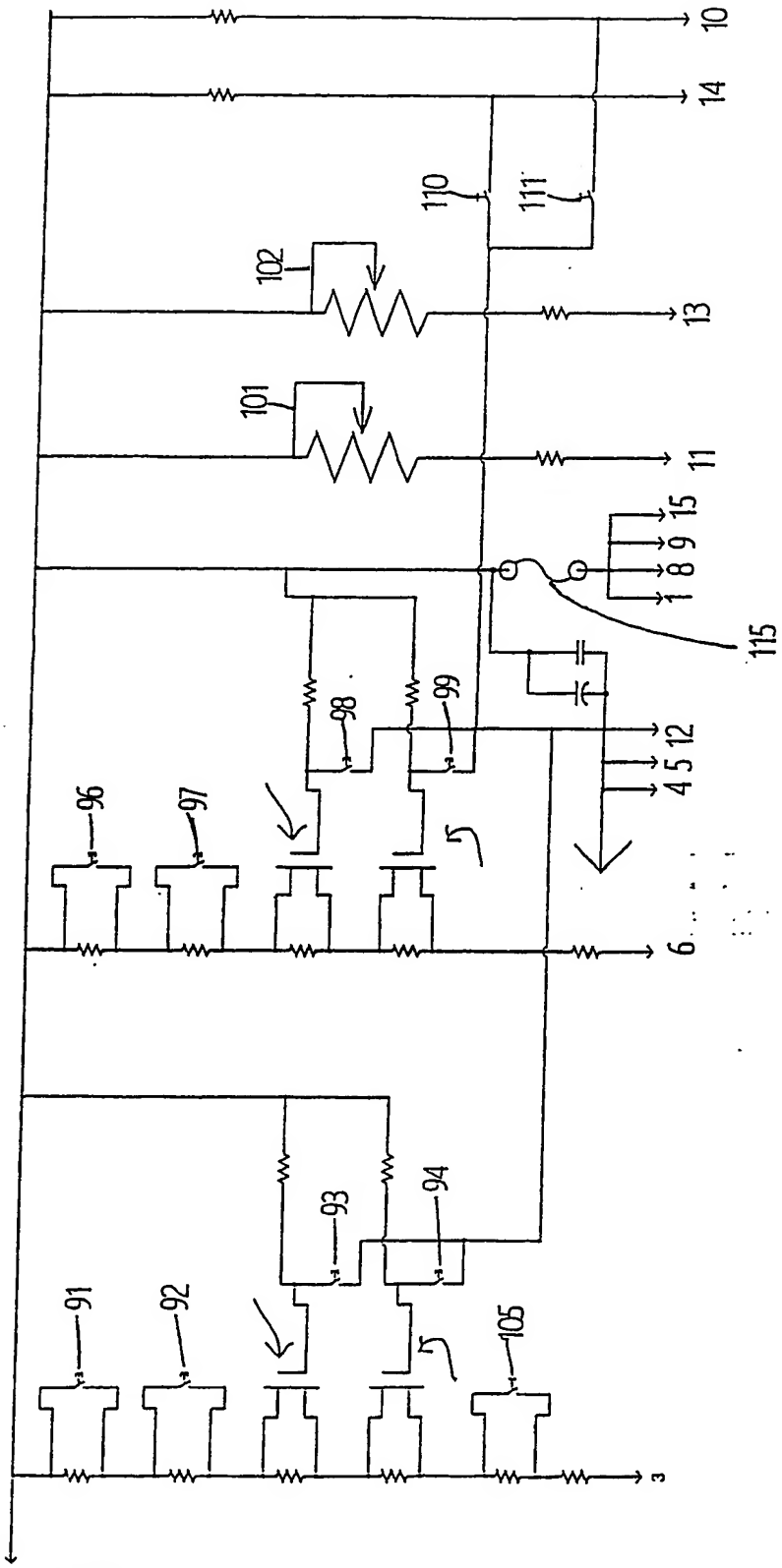


FIGURE 8


10
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102
13
101
11
15
9
8
1
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99
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4
96
97
6
93
94
91
92
105
3
Vcc

FIGURE 9

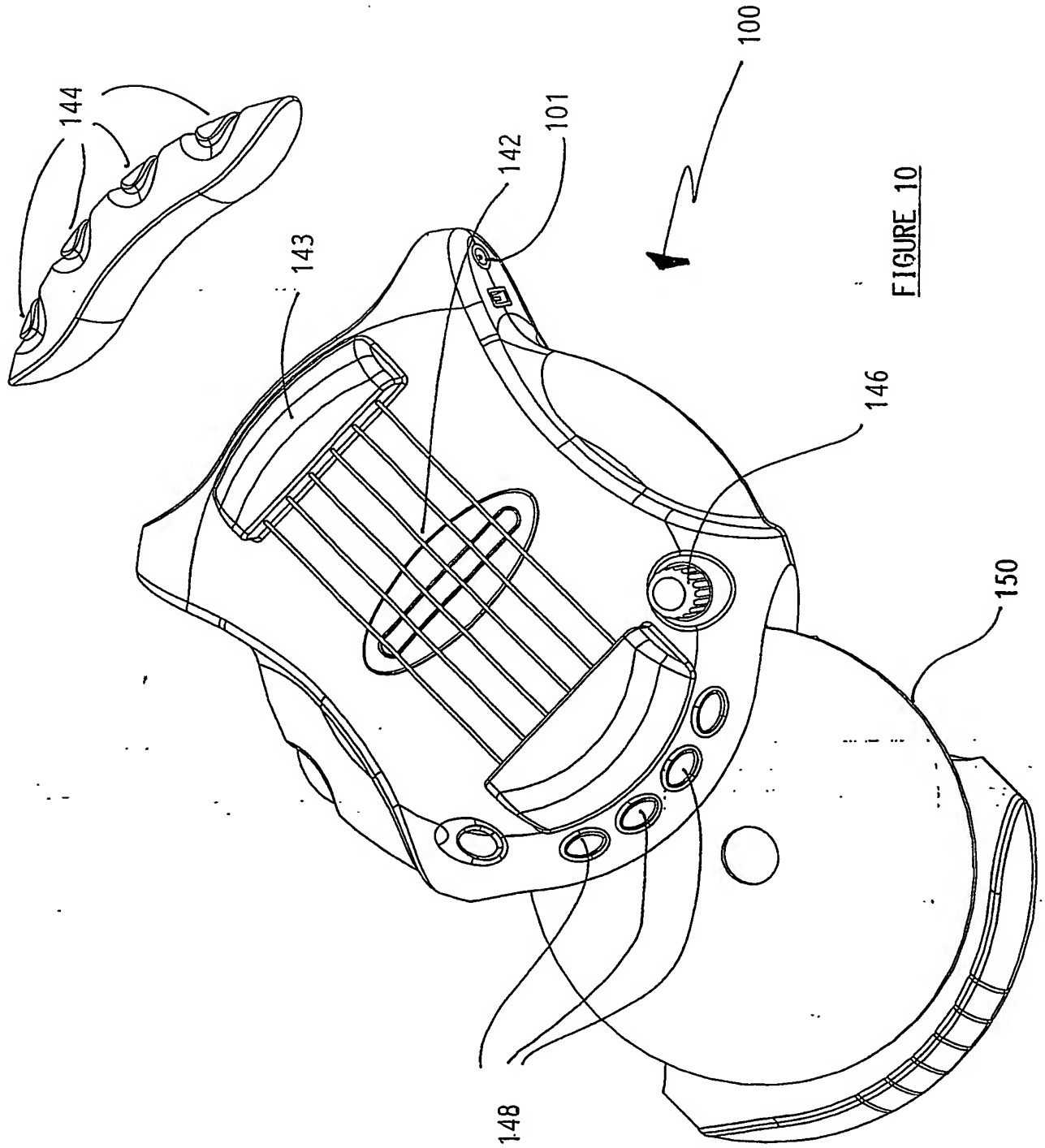


FIGURE 10

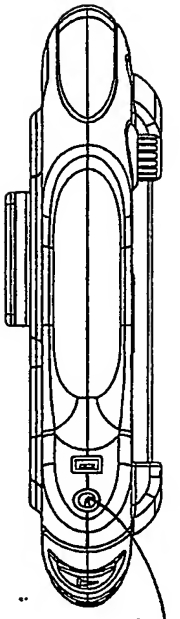


FIGURE 13

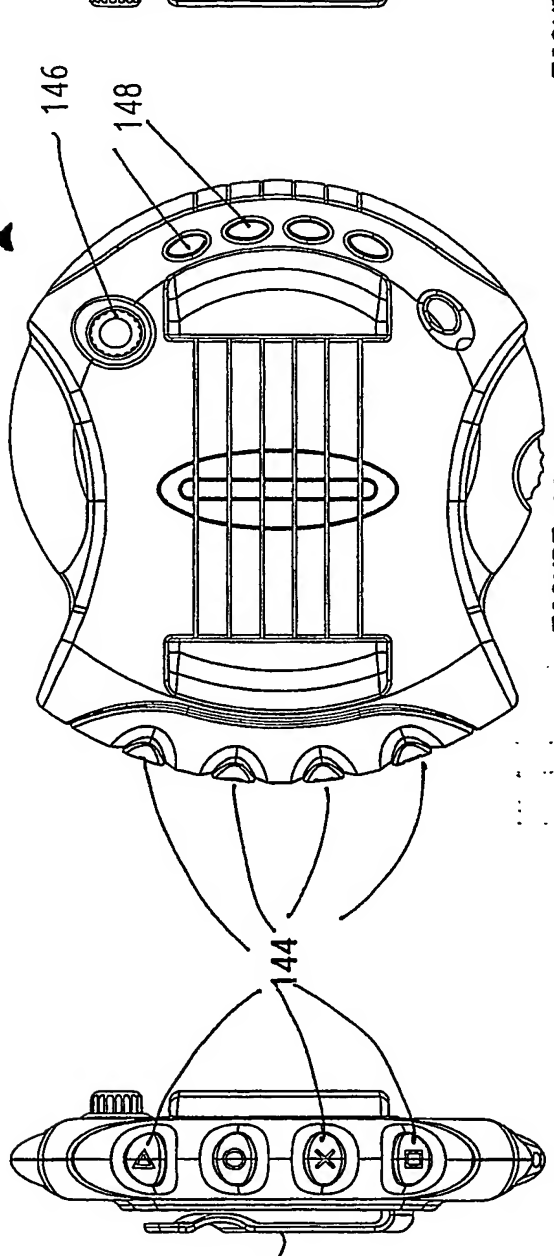


FIGURE 11

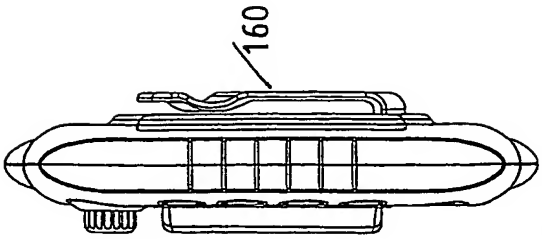


FIGURE 15

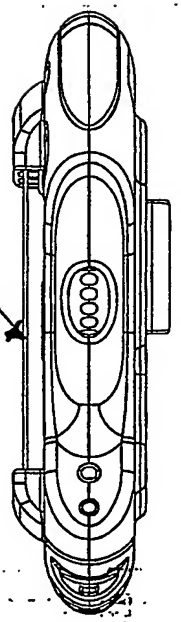
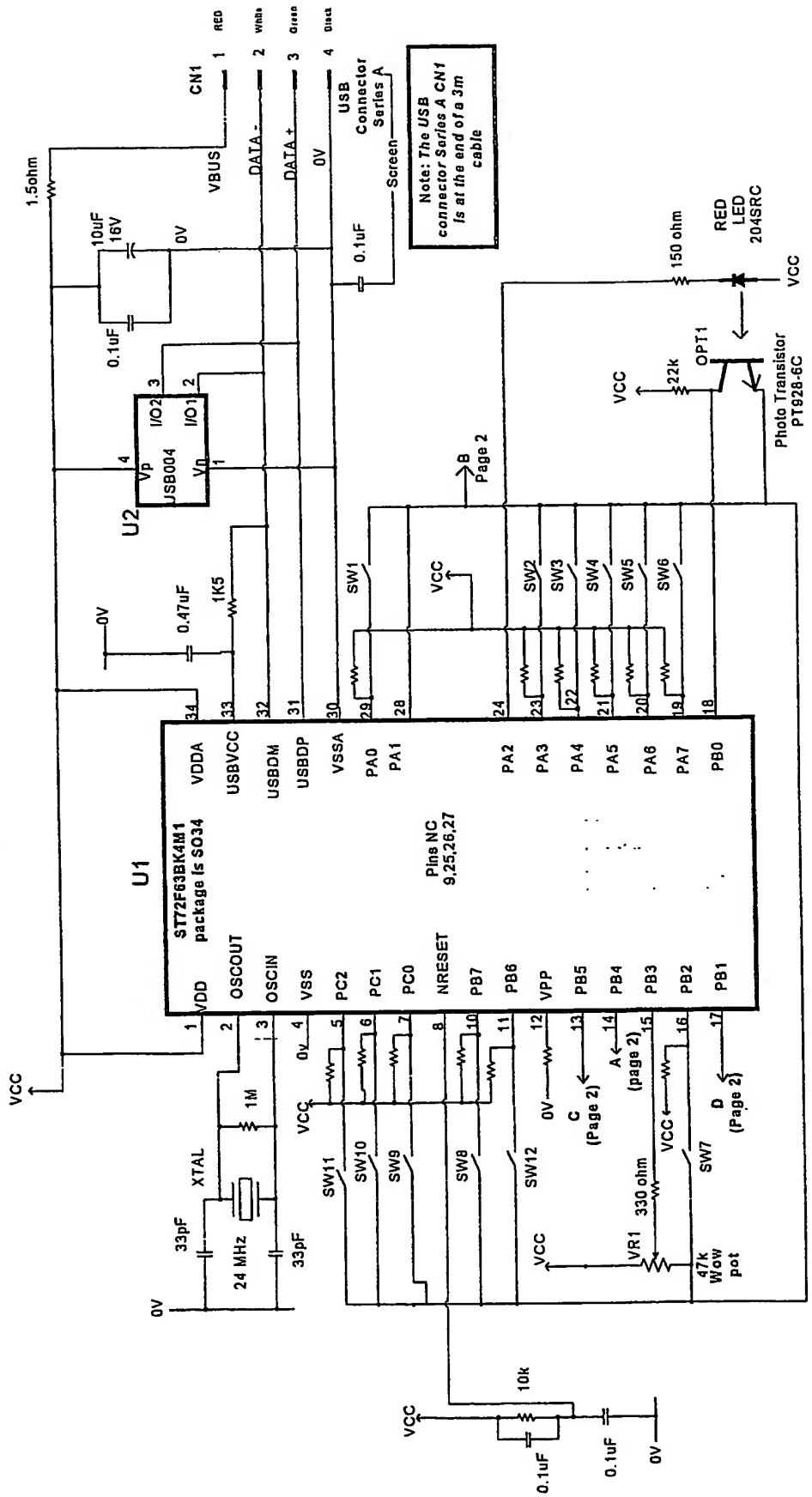


FIGURE 12

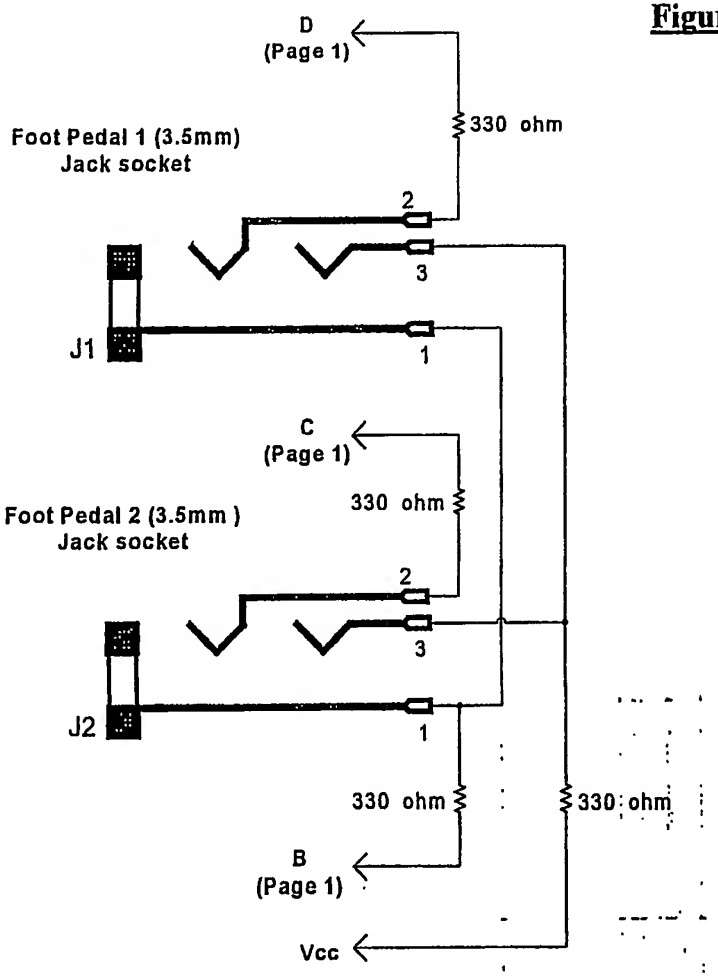
FIGURE 14

Figure 13 (i)



Note: 1. All resistors 4k7 except where stated

Figure 13 (ii)



Note: 1. All resistors 4k7 except where stated

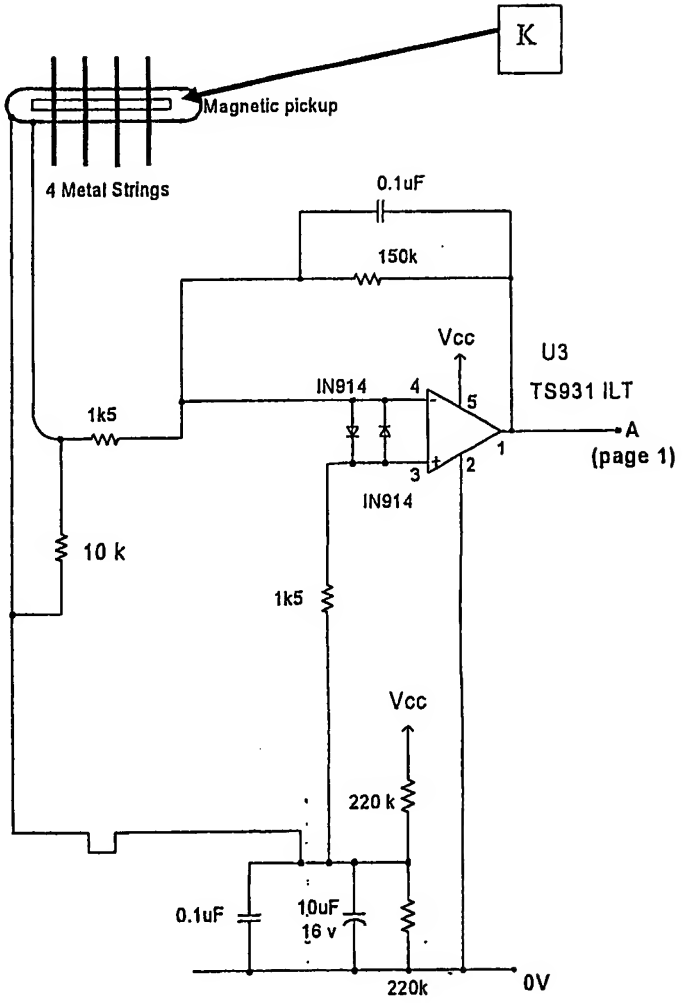


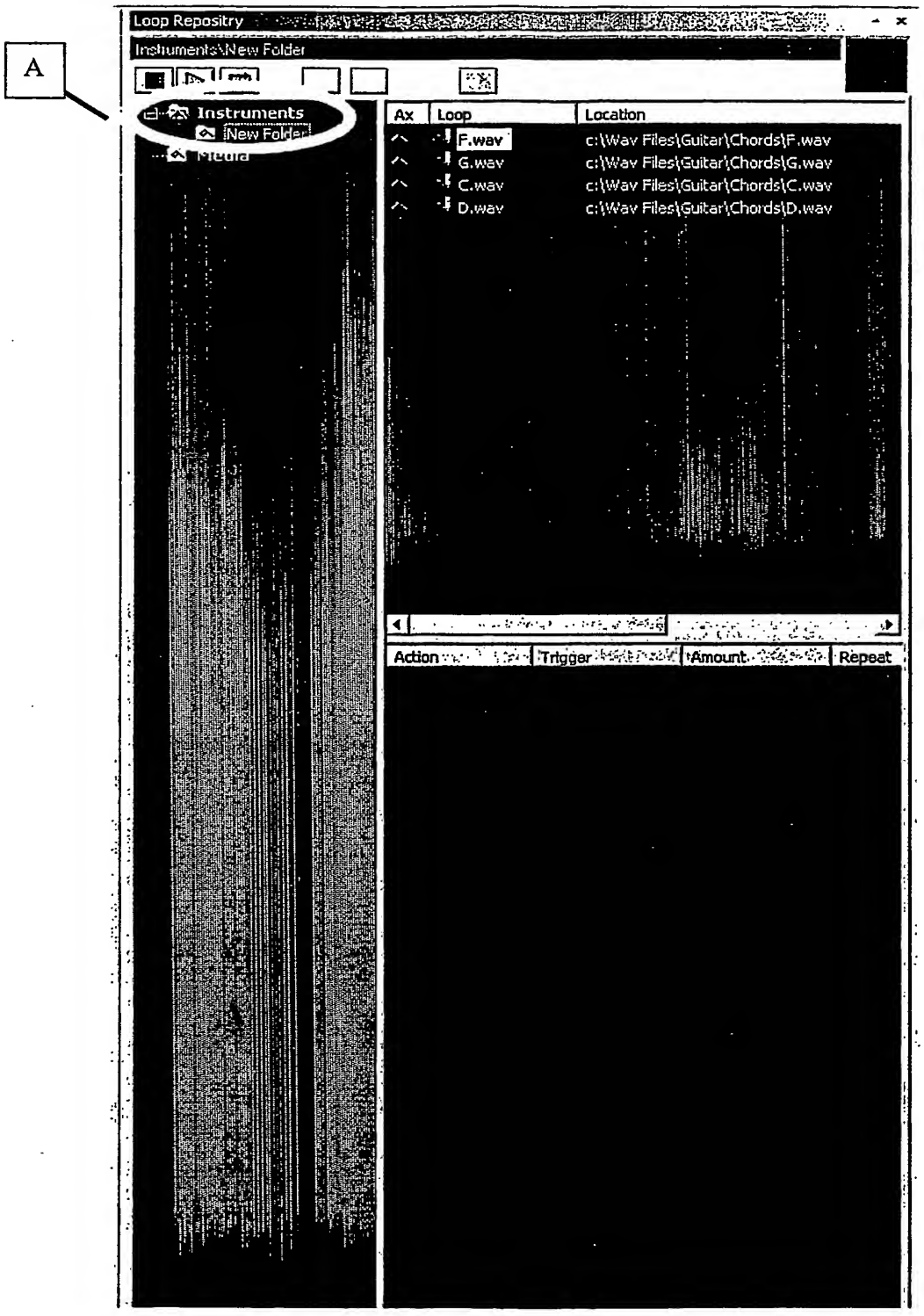
FIGURE 14

Label A

THE DIATONIC C SCALE:
C C# D D# E F F# G G# A A# B C
D♭ E♭ G♭ A♭ B♭
SELECTED INSTRUMENTS (EXAMPLE MENU)
ELECTRIC GUITAR
OVERDRIVE GUITAR
DISTORTION GUITAR
ACOUSTIC BASS
ELECTRIC PICK
ORGAN
PIANO
TRUMPET
ETC.

Label B

EXAMPLE: 'C' CHORD CHOICES	
C	C6
Cm	Cm6
Cdim	CM7
Caug	CM9
Csus	C7
C2	Cm7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Instruments\New Folder
Instruments
New Folder
Media
Ax
Loop
Location
F.wav
c:\Wav Files\Guitar\Chords\F.wav
G.wav
c:\Wav Files\Guitar\Chords\G.wav
C.wav
c:\Wav Files\Guitar\Chords\C.wav
D.wav
c:\Wav Files\Guitar\Chords\D.wav
Action
Trigger
Amount
Repeat

FIGURE 15

FIGURE 16

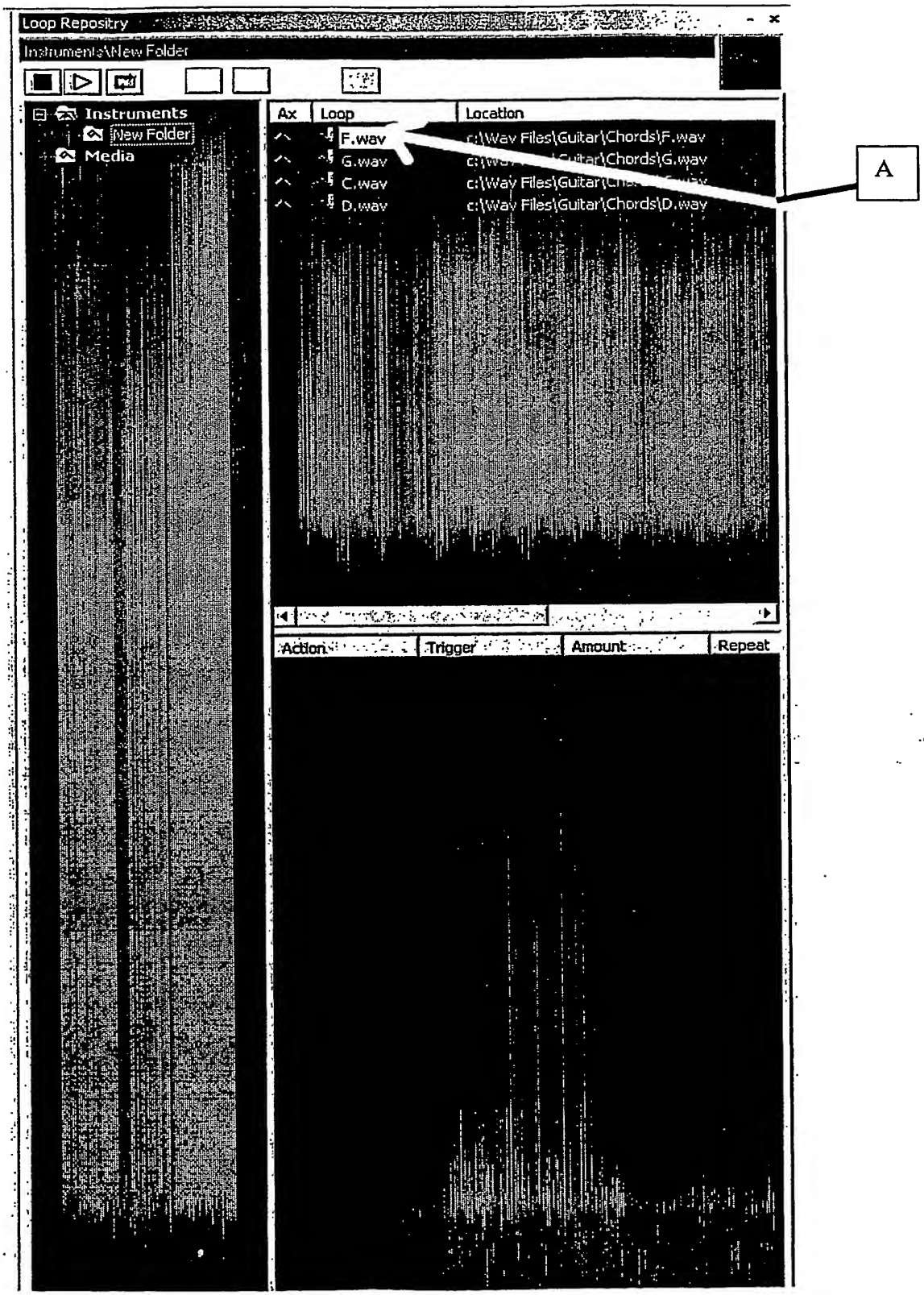

Loop Repository
Instruments\New Folder
Instruments
New Folder
Media
Ax
Loop
Location
F.wav
c:\Wav Files\Guitar\Chords\F.wav
G.wav
C.wav
D.wav
c:\Wav Files\Guitar\Chords\D.wav
Action
Trigger
Amount
Repeat
A

FIGURE 17

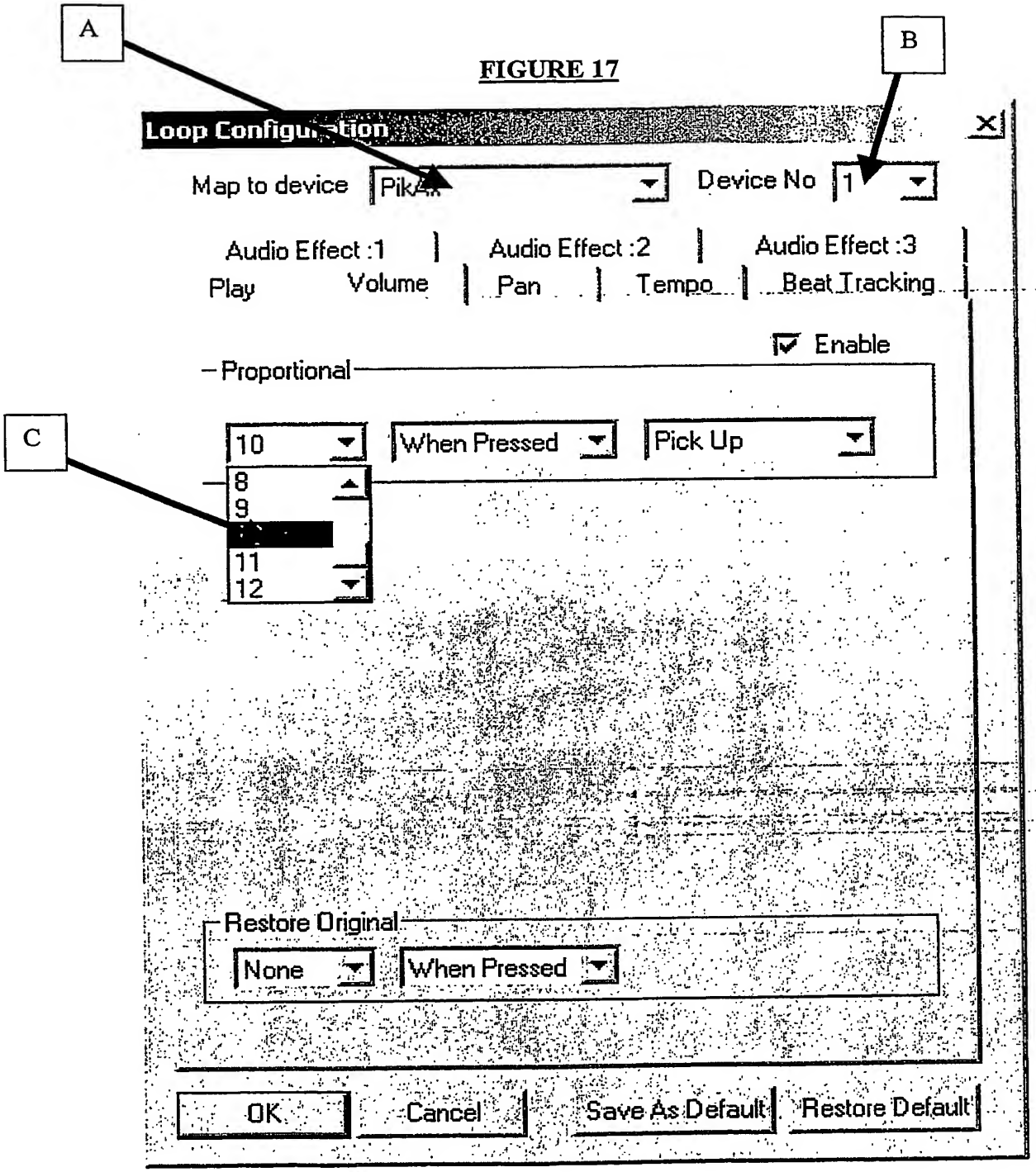

A
B
C
Loop Configuration
Map to device
Device No
1
Audio Effect :1
Audio Effect :2
Audio Effect :3
Play
Volume
Pan
Tempo
Beat Tracking
Enable
Proportional
10
When Pressed
Pick Up
8
9
11
12
Restore Original
None
When Pressed
OK
Cancel
Save As Default
Restore Default

FIGURE 18

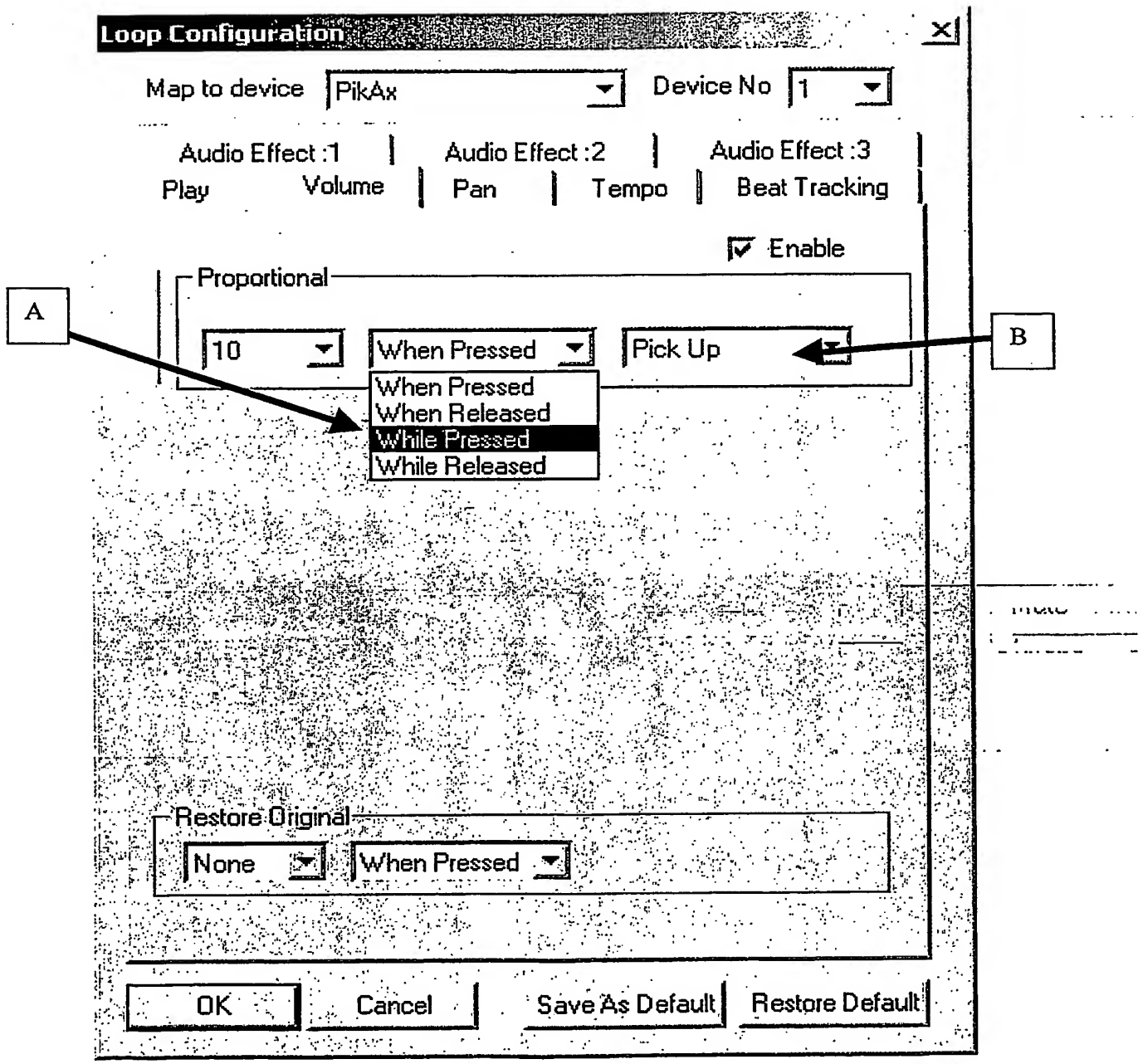

Loop Configuration
Map to device
PikAx
Device No
1
Audio Effect :1
Audio Effect :2
Audio Effect :3
Play
Volume
Pan
Tempo
Beat Tracking
Enable
Proportional
A
10
When Pressed
Pick Up
B
When Pressed
When Released
While Pressed
While Released
Restore Original
None
When Pressed
OK
Cancel
Save As Default
Restore Default

FIGURE 19

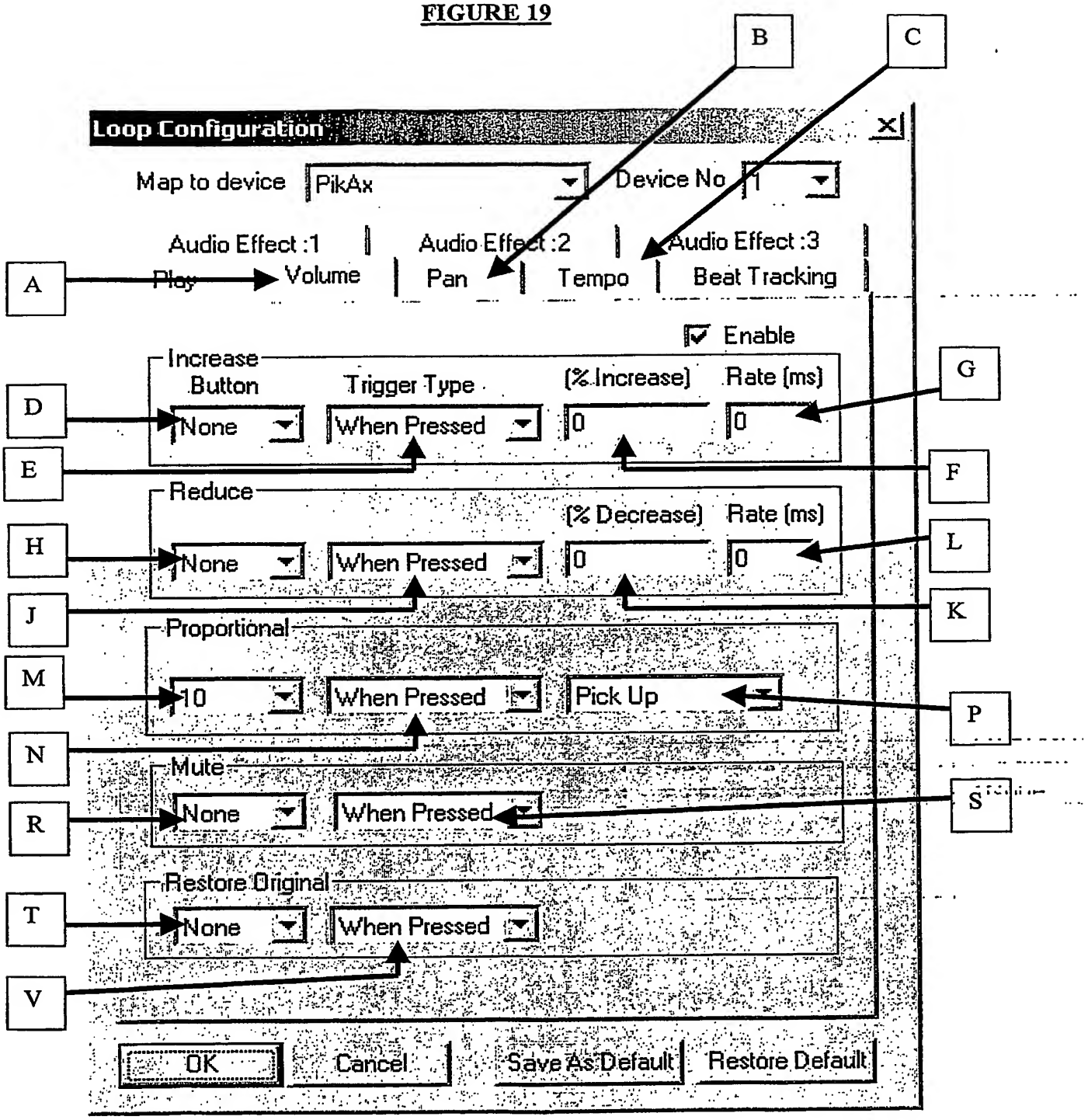

B
C
Loop Configuration
Map to device
PikAx
Device No
1
Audio Effect :1
Audio Effect :2
Audio Effect :3
A
Play
Volume
Pan
Tempo
Beat Tracking
Enable
Increase
Button
Trigger Type
(% Increase)
Rate (ms)
G
D
None
When Pressed
0
0
E
F
Reduce
(% Decrease)
Rate (ms)
H
None
When Pressed
0
0
L
J
K
Proportional
M
10
When Pressed
Pick Up
P
N
Mute
None
When Pressed
S
R
Restore Original
T
None
When Pressed
V
OK
Cancel
Save As Default
Restore Default

FIGURE 20

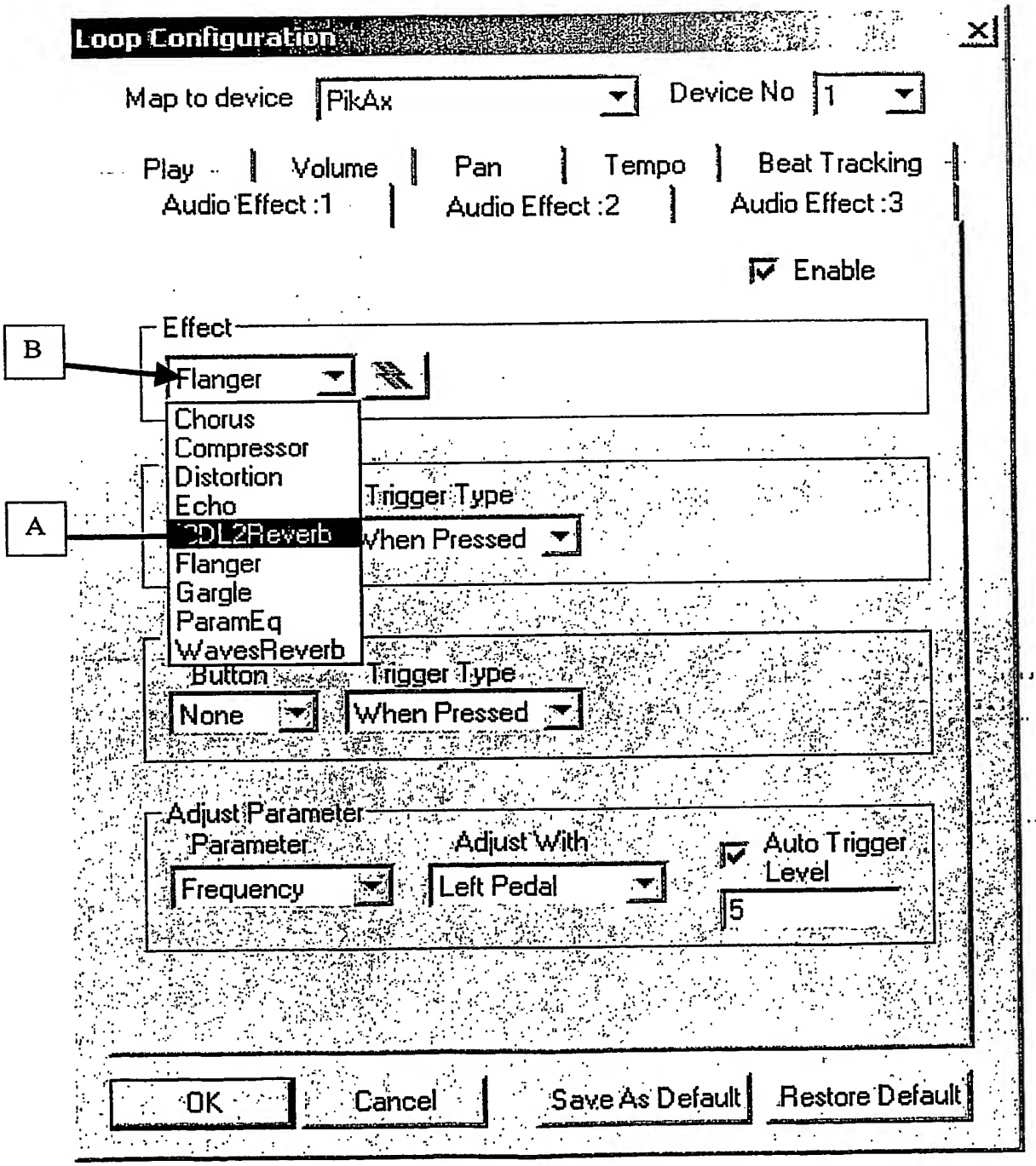
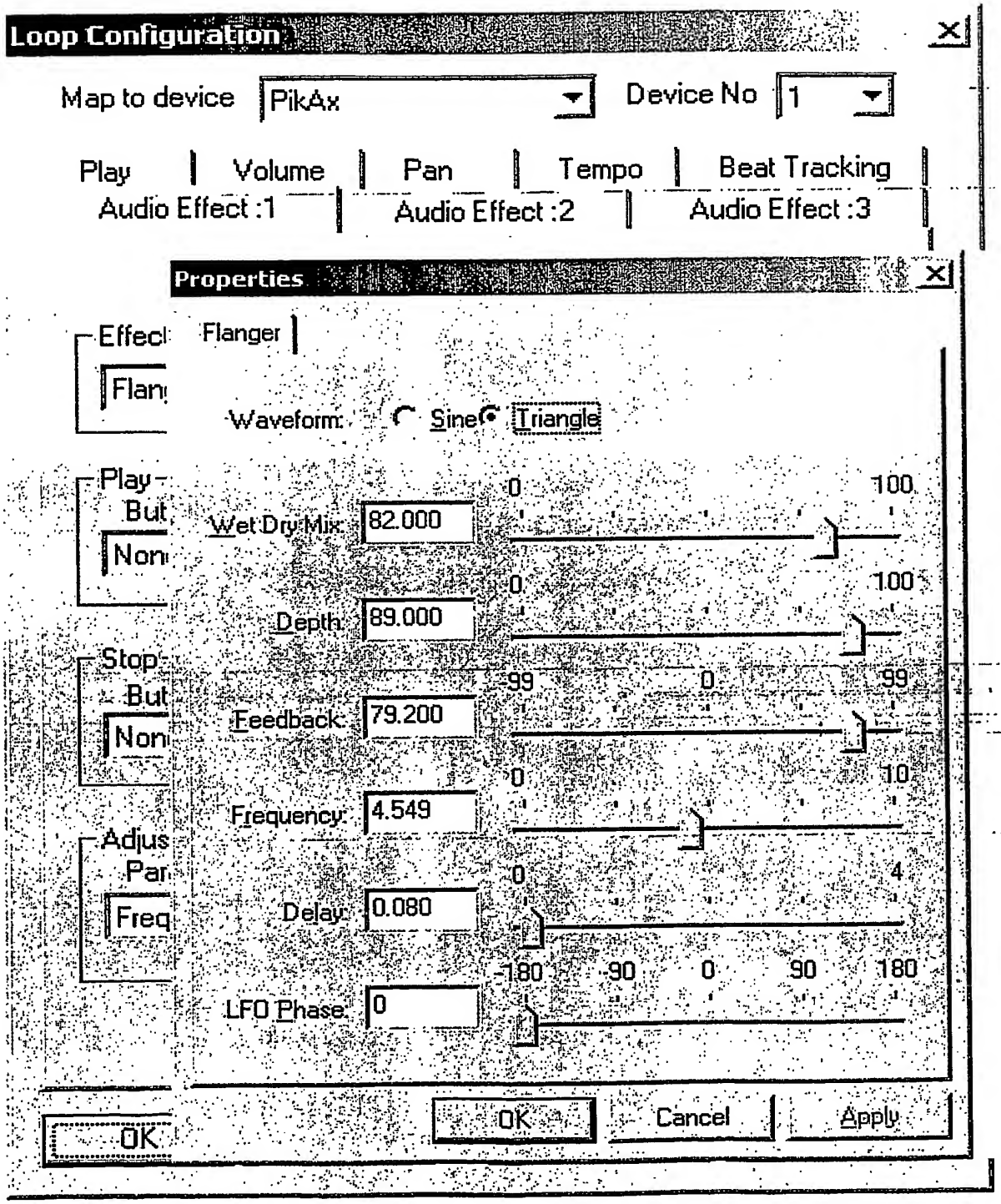

Loop Configuration
Map to device
PikAx
Device No
1
Play
Volume
Pan
Tempo
Beat Tracking
Audio Effect :1
Audio Effect :2
Audio Effect :3
Enable
B
Effect
Flanger
Chorus
Compressor
Distortion
Echo
I3DL2Reverb
Flanger
Gargle
ParamEq
WavesReverb
A
Trigger Type
When Pressed
Button
Trigger Type
None
When Pressed
Adjust Parameter
Parameter
Adjust With
Auto Trigger Level
Frequency
Left Pedal
5
OK
Cancel
Save As Default
Restore Default

FIGURE 21


Loop Configuration
Map to device
PikAx
Device No
1
Play
Volume
Pan
Tempo
Beat Tracking
Audio Effect :1
Audio Effect :2
Audio Effect :3
Properties
Flanger
Waveform:
Sine
Triangle
Wet Dry Mix:
82.000
Depth:
89.000
Feedback:
79.200
Frequency:
4.549
Delay:
0.080
LFO Phase:
0
0
100
-99
0
99
10
4
-180
-90
90
180
OK
Cancel
Apply

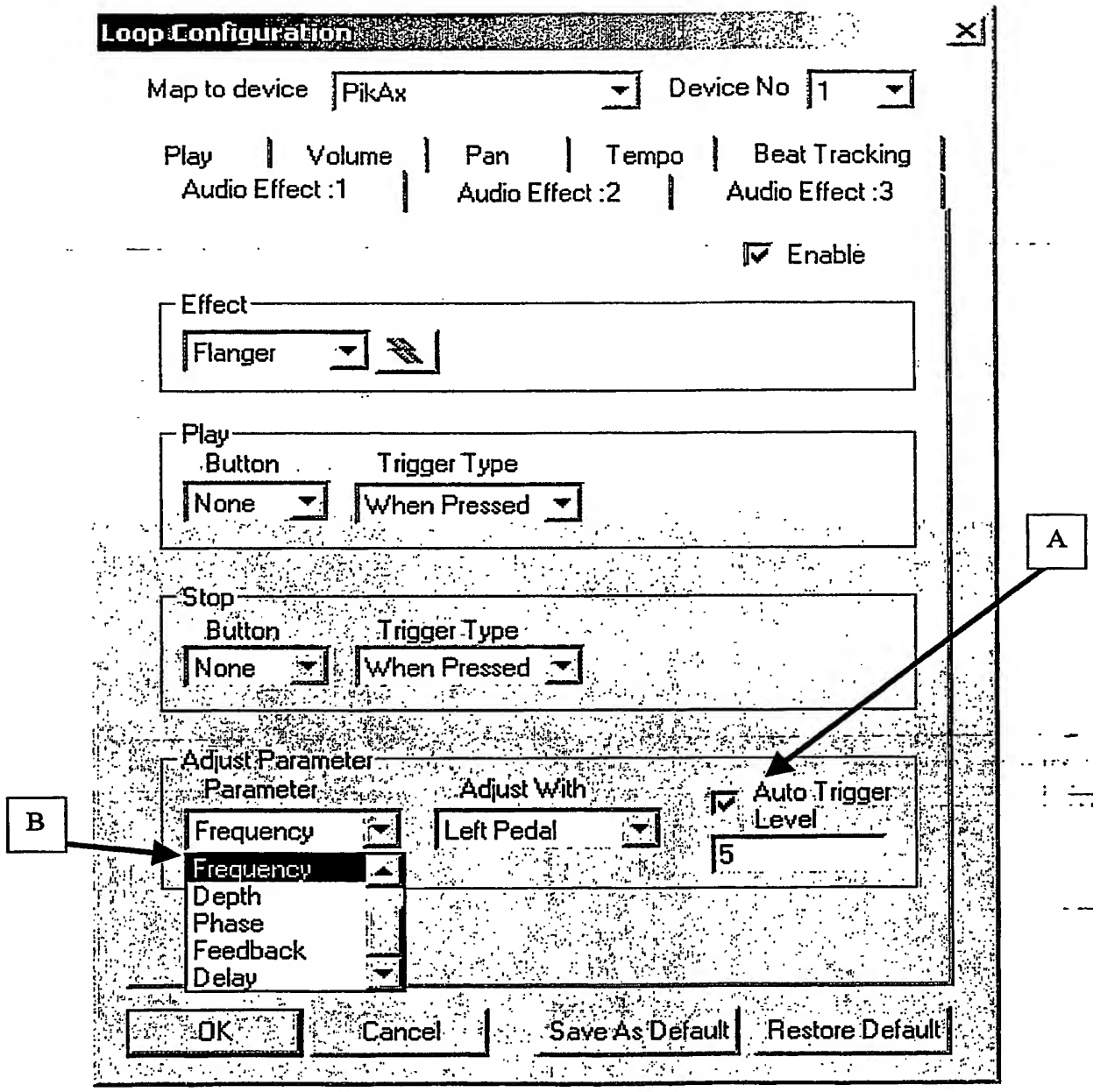
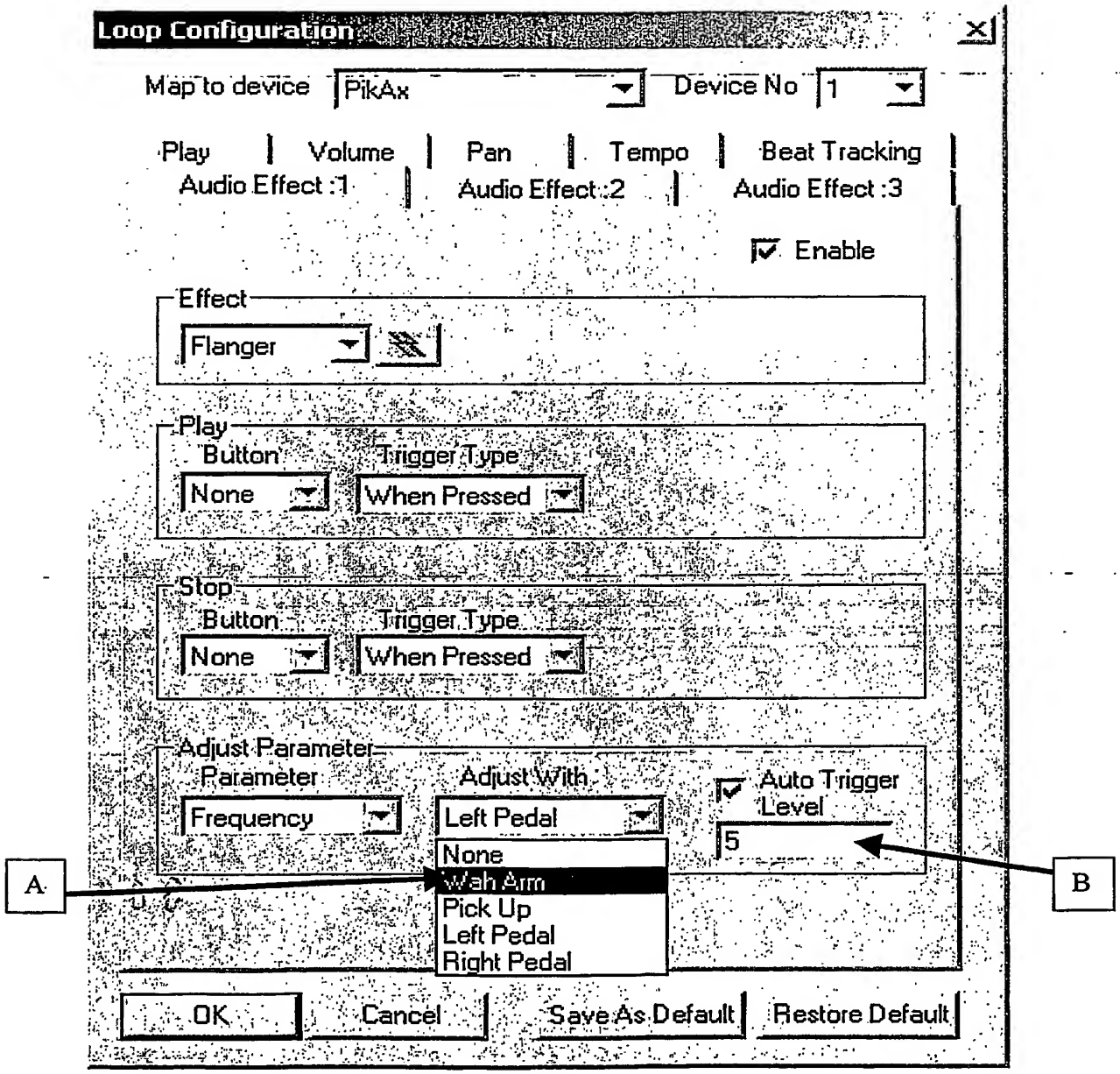

Loop Configuration
Map to device
PikAx
Device No
1
Play
Volume
Pan
Tempo
Beat Tracking
Audio Effect :1
Audio Effect :2
Audio Effect :3
Enable
Effect
Flanger
Play
Button
Trigger Type
None
When Pressed
Stop
Button
Trigger Type
None
When Pressed
Adjust Parameter
Parameter
Adjust With
Auto Trigger
Level
Frequency
Left Pedal
5
Frequency
Depth
Phase
Feedback
Delay
OK
Cancel
Save As Default
Restore Default
A
B

FIGURE 22

FIGURE 23


Loop Configuration
Map to device
PikAx
Device No
1
Play
Volume
Pan
Tempo
Beat Tracking
Audio Effect :1
Audio Effect :2
Audio Effect :3
Enable
Effect
Flanger
Play
Button
Trigger Type
None
When Pressed
Stop
Button
Trigger Type
None
When Pressed
Adjust Parameter
Parameter
Adjust With
Auto Trigger
Level
Frequency
Left Pedal
5
None
Wah Arm
Pick Up
Left Pedal
Right Pedal
A
B
OK
Cancel
Save As Default
Restore Default